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ESSENTIALS OF INDUSTRIAL EDUCATION

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PREFACE

Two great wars, a disastrous economic recession, a period of rapid and extensive economic expansion, and a rearmament program of large proportion all occurring in one generation have served to demonstrate in dramatic fashion the vital importance of industrial education. Each of these events has created a special demand for industrial training. However otherwise the present age may be designated in history, it will certainly be known as an industrial age. One of the most significant features of contemporary life is modern industry, and neither general education nor vocational education can be adequate if important phases of industrial education are omitted from their programs.

This book is an attempt to meet the need of the student of modern education and modern industry for an understanding of the history, problems, and procedures of industrial education. It is specially designed as a textbook for those preparing themselves to become teachers in the field of industrial education, whether in the public schools or in schools operated within industry. It is hoped that the book will also be of assistance to the experienced industrial teacher and administrator as well as to any others who are interested in industrial education.

The author has drawn freely upon one of his earlier books that is now out of print, but all such materials have been carefully revised, and much new material has been added. This volume is much more than a revision of an older book; it is a new book written for students of today and of the years immediately ahead. The major purpose is to present a clear, accurate, and readable account of the background, problems, purposes, and procedures of industrial education, which will aid the reader to understand more clearly the role of this phase of education in modern life.

ARTHUR B. MAYS

URBANA, ILL.
December, 1951

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Chapter 1

ORIGIN AND SIGNIFICANCE OF INDUSTRIAL EDUCATION

Early Forms of Industrial Education. The earliest form of industry was the making of tools, weapons, utensils, clothing, and shelter needed and invented by primitive man. The learning by the young to make such needed articles was the earliest form of industrial education. Little is known, or can be known, of man's earliest efforts to make useful objects because only those artifacts made of durable materials have survived the many thousands of years during which it is believed man has existed. However, the objects of stone, clay, bone, copper, and bronze that have been found are sufficient in number and variety to enable the archaeologist and the anthropologist to reach interesting and important conclusions concerning the culture of prehistoric races. Much that is inferred about the later developments of human life, before recorded history, can be confirmed in large part by the study of the cultures of primitive tribes now existing in Africa, Australia, certain Pacific islands, and South America. From all that is known of prehistoric man, it seems clear that there is a vital relationship between his ability to make useful things and his progress toward civilization. Obviously his ability to make useful or ornamental objects is conditioned by the success of each generation in transmitting acquired skills and knowledge.

Measures of Progress. There is evident a definite progression in the development of inventiveness and skill. The anthropologist determines the stages of advance of primitive man by the character and quality of the products of his hands. The fundamental relationship of growth in skill and mental progress is assumed by anthropologists, and it seems clear that the transmission and perpetuation of manufacturing skills has throughout the ages been an essential element in human evolution. Man's ability to interpret accidental phenomena and to generalize from his interpretation is also a measure of his degree of mental progress. It is not known, for example, how many centuries or millenniums were required for man to discover the value of copper as a material for making ornaments, tools, and weapons. It is probable that his first observations occurred as a result of the accidental melting of copper in the rocks used to hold together wood burned for heat or cooking. Probably many years elapsed before the superiority of bronze over copper was discovered. Copper and tin often occurred close together in rocks, and again it seems probable the alloy was accidentally discovered. Progress came when man was able to interpret the meaning of the phenomenon of mixed metals in the fire, from using the mixture to make weapons, and from forming the generalization that copper mixed with tin is better than copper alone.

Spiral of Progress. With the harder metal, more effective weapons and tools were made, and their use provided more safety and better living conditions and possibly, in time, stimulated curiosity about metals and a desire for more and still better products. Progress was possible only by transmitting to the new generation what was known, and eventually another metal, iron, was found to be superior in many respects to bronze. This process of discovery, largely through chance or accidental occurrence, of new materials or new techniques of fighting, of work, or of expression of mental images; of interpreting the new discovery as a better way to carry on necessary activities; and of adopting the new as the approved way and passing it on to the new generation seems to be the process of the progress of the race. It is as true today as in primitive times, notwithstanding that modern man searches continually for better things. The growing interest in the search, the increasing powers of interpretation and generalization are among the chief elements distinguishing modern man from primitive man. It seems clear that the process of (1) new invention or discovery, (2) resulting increase of knowledge and security, (3) still other invention or discovery resulting from the increased knowledge and security, (4) further increase of knowledge and well-being as the result of yet further invention, is a continuing and accelerated spiral of progress.

It is obvious that an essential element in the spiral is the transmission of both knowledge and skill to the young, and that the knowledge and skill necessary for manufacturing needed objects from both old and new materials is a major phase of the total process. This aspect of teaching the new generation is what is meant by "industrial education."

Modern Significance of Industrial Education. In the modern world, however, industrial education has come to mean more than the mere transmission of acquired skills and technical knowledge. Modern man has discovered the cultural or developmental value of working skillfully, of thinking about work analytically, of experimenting with possible better ways of doing work, and of understanding the social meaning of work well done. Man has reached the point of deliberately planning to produce progress, and he has learned to use manual skills and technical knowledge as means of mental growth as well as of economic and social progress. Industrial education, therefore, has come to be an important phase of general or cultural education as well as a necessary means of transmitting accepted technical theories, facts, and skills.

Educative Values. The moral value of skillful work with the hands in producing useful products has also been recognized by civilized man. The Hebrews probably were the first to appreciate this value in manual work. Bennett shows by quotations from the Talmud the religious and moral significance attached to learning a trade by the religious teachers of the Hebrews. Among these quotations are the following: "He who does not have his son taught a trade prepares him to be a robber." "He who applies himself to study alone is like him who has no God." "As it is your duty to teach your son the law, teach him a trade." "Great is the dignity of labor; it honors man." "It is well to add a trade to your studies; you will then be free from sin." "He who lives on the toil of his hands is greater than he who indulges in idle piety."[1] This concept of the educative and moral values in work with hand tools in the construction of useful objects seems to be deeply imbedded in the mind of thinking men and finds expression frequently throughout history. The monks of the Middle Ages, while not clearly perceiving the intellectual value of skilled labor, were emphatic in their belief in its moral values. Bennett says that "with the teaching of the rabbis in the background and the examples of Jesus, the carpenter of Nazareth, and his disciples in the foreground, it is not strange the early Christian monks, in their great enthusiasm, made a fetish of manual labor."[2] Some of the most famous orders of monks from earliest times divided the day approximately equally between religious devotions and manual labor. Throughout the Middle Ages much of the finest craftsmanship was done by the monks in their monasteries, some of the monasteries becoming famous for their superior products. Before the rise of guild apprenticeship in the latter part of the medieval period, much, if not most, of the best industrial education occurred within the monasteries.

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[1] Bennett, Charles A., *History of Manual and Industrial Education Up to 1870*, Peoria, Ill., Chas. A. Bennett Company, Inc., 1926, Vol. I, pp. 13–14.

Rousseau, the great reformer of the eighteenth century, wrote that "Emile will learn more by one hour of manual labor than he will retain from a whole day's verbal instruction . . . If, instead of making a child stick to his books, I employ him in a workshop, his hands labor to the profit of his mind . . . ." In more recent times Nicholas Murray Butler wrote: "That work itself is an educational instrument of unrivalled utility and significance usually escapes public attention. The discipline and information which some persons obtain from books and laboratories, others obtain from systematic occupation." This concept of the educative significance of training for work involving skill and thinking has been a potent factor in the development of the modern school, and its basic soundness is more generally accepted today than at any previous time in the history of education.

Need for Effective Industrial Education. Western civilization is now in an age variously designated as "the scientific age," "the machine age," and "the industrial age." During such times the training of the young in the skills, technical knowledge, and social meaning of industry is one of the major concerns of society, and the effectiveness of its industrial education is of far-reaching importance. It is increasingly clear that an overemphasis upon industrial education at the expense of the spiritual culture of the race is dangerous and could easily end in the destruction of civilization, but it is equally clear that failure to provide a highly effective industrial education will bring to an end all progress toward a higher level of civilization. It is also clear that industrial education has played a major role throughout the history of the human race from the earliest times of primitive society to the present day. It is essential that the story of the part played by industrial education in the evolution of the race be understood by students of modern education if its problems are to be dealt with intelligently. Industrial education is not a new device added to the traditional school to increase interest or "to keep boys in school longer," nor is it merely an "exploratory experience." It antedates academic education by thousands of years, and it is, as it always has been, a fundamental element in the progress of the race. Its significance in modern education, as in modern civilization, lies in its role as a fundamental means of mental, moral, and economic growth, and as a basis for the growth and maintenance of all the essential human institutions.

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[2] *Ibid.*, p. 17.

Industry in the twentieth century is so central in economic welfare that the political strength of a nation is conditioned by its industrial facilities. The rivalry among nations today is chiefly an industrial rivalry. Success in warfare and influence in international affairs are determined in large measure by the industrial resources of a nation. Among these resources is what is popularly called "industrial know-how." The mere possession of natural resources and even of industrial equipment is not sufficient to give superiority. The essential factors, in addition, are skill, technical knowledge, energy, and the willingness and ability to work efficiently. These factors result chiefly from effective industrial education that is available to all the people of a nation. To be most effective, this type of education must be varied in kind. Opportunities to learn certain facts and skills and to acquire certain desirable attitudes, habits, and ideals of work must be available in day schools for children and youth; other opportunities must be found in industry, and others in evening, correspondence, and part-time schools for youth and adults, and in apprenticeships for older youth. Whatever the means may be, the strength and progress of a nation and, in the long run, of a race, depend in large part upon the effectiveness of its industrial education in every generation.

Summary and Conclusions. It seems clear that human progress from primitive life to civilization has been in large part a result of discoveries, efforts to explain those discoveries, trial and error, thinking about causes of success and failure, inventions resulting from such experiences, and transmitting acquired knowledge and skill to the new generation. Basic in the process have been and are the discoveries of materials and procedures involved in the making of useful objects needed for protection and for the maintenance and improvement of living conditions. The process is as old as man's first efforts to advance, and it operates today as in all the past, except that modern man is less dependent upon chance and deliberately plans for progress through scientific research. Progress still depends, however, upon successful transmission of man's increasing knowledge and ability to control and utilize the forces and materials of nature. The transmission of the knowledge, skills, and the necessary attitudes that result in effectively supplying the physical needs of the race and in making possible improvement in the tools and useful objects that condition civilized life constitutes what is meant by industrial education.

QUESTIONS AND ASSIGNMENTS

1. Why is it appropriate to refer to the method of progress from primitive life to civilization as a "spiral"?
2. How do archaeologists date the various stages of human development?
3. Why is it important to study the few primitive peoples still to be found?
4. Describe the probable effects on human development of the discovery of iron and the means of shaping it into weapons and tools.
5. Show as clearly as you can the social and economic significance of industrial education in modern civilization.
6. To what extent and in what manner does the transmission of industrial knowledge and skill contribute to intellectual growth?
7. Describe and illustrate the effects of man's adoption of the scien-

tific method on the growth of industrial education and on the speed of material progress.

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Chapter 2

PLACE OF APPRENTICESHIP IN THE HISTORY OF INDUSTRIAL EDUCATION

Definition and Meaning. Modern industrial education has its roots in the history of apprenticeship, which is the oldest form of education known to man. As a social institution apprenticeship goes back into the dim reaches of recorded history. As a method of teaching and learning it starts long before the beginning of civilization. It is necessary, therefore, to distinguish between apprenticeship as a method of industrial education and as a social institution.

As a method, it may be defined as a process of learning by doing from one who is at the moment engaged in the art being learned. It differs from the learning of a trade or other art in a school because at the moment of learning in a school the teacher is engaged in the vocation of teaching rather than in the vocation being taught. There is much involved in this distinction. In apprenticeship the learning is incidental to the work in hand at the moment and there is little opportunity for orderly, progressive instruction. Repetition of those processes that can be quickly learned often occurs, while the more difficult processes that occur rarely are likely to be inadequately taught. The same lack of balance in learning occurs with reference to the technical knowledge acquired, and for the same reason. The incidental character of the teaching and learning makes for much inefficiency in teaching and often results in trade preparation that has significant deficiencies in both knowledge and skills. The effects of this weakness in apprenticeship can be avoided by careful planning of the instruction to be given and strict adherence to the plan by the master with whom the apprentice works. In guild apprenticeship frequent inspections of the work and progress of the learner by guild representatives and the examination required for advancement to journeymanship were means of overcoming, in part, this weakness of the apprenticeship method. In the case of the industrial school the instruction is likely to be given in an orderly manner and it can be organized on the basis of the learning process as indicated by psychology. It lacks, however, the atmosphere of reality that apprenticeship possesses, and the incentive to learn and achieve seems to be weaker in the school than in the production shop. Under modern conditions neither apprenticeship nor the trade school is completely satisfactory for training skilled industrial workers. When both are used to contribute to the training of mechanics, each seems to supply the deficiencies of the other, and the results are usually excellent. Experience has taught that both are needed for a balanced and effective program of trade education and training for work in modern industry.

Essential Characteristics. Notwithstanding certain weaknesses, the apprenticeship method of teaching and learning possesses certain important advantages over all other methods. Among these is the fact that it is the normal human method of transmitting skills and the technical knowledge needed in the performance of the skills; it is the method human beings invariably resort to when untutored in pedagogical procedures. Furthermore, it makes use of the native imitativeness of the learner when trying to master an art. It gives recognition to the fact that learning *how to perform* an act from verbal instruction and learning *to perform* an act after seeing the master perform it constitute two distinct psychological situations. Schools sometimes fail to take into consideration the fundamental difference between the two situations. One may learn *how to swim* from a book, but one cannot learn *to swim* without going into the water and there performing the act, preferably in imitation of an expert. Another strength of apprenticeship as a method lies in the fact that it, of necessity, is wholly individual teaching. It involves individual instruction on the processes in which the learner is assisting the master, and the instruction is therefore informal and timely. It is timely in the sense that it is given when most needed. It is most needed when the learner is ready to begin the act for the performance of which he requires instruction. The practical impossibility of maintaining this desirable timeliness of instruction in class or group instruction is a basic weakness of most school teaching. A further strength of the method is its similarity to the teaching and learning to which the apprentice has been accustomed in his home since birth. In a sense the apprenticeship method is essentially an extension into the shop of the traditional parental and family procedure of teaching and guiding the young. Medieval apprenticeship at its best stressed this personal, family relationship, and its success as a means of industrial education was probably due chiefly to this feature. Under modern factory conditions much of the father-son relationship has been lost, and its loss is a major cause of the inferiority of modern apprenticeship when compared with earlier forms.

As the sole means of industrial education, apprenticeship possesses the fundamental defect that it is essentially nonprogressive and tends to repeat traditional procedures rather than to experiment with new ways of doing work. The master is prone to work as he was taught and to teach the things he learned from *his* master. It is significant that apprenticeship enjoyed its greatest fame and effectiveness during the centuries when society was static in organization and the great concern of the crafts, as of the other groups, was the maintenance of the *status quo*. It was a time when the ambition of many of the intellectual leaders was to achieve the greatness of the "golden ages" of antiquity. When men turned their faces toward the future and the spirit of experimentation and invention took possession of their thoughts, traditional guild apprenticeship began to decline and rapidly disappeared after the advent of the industrial revolution. The fact that the one giving instruction in apprenticeship is neither trained to teach nor primarily concerned with teaching, but is occupied chiefly in production, makes the study of new methods, the inculcation of the scientific attitude, and a desire to experiment and invent unlikely. One whose sole responsibility is to teach, to stimulate thought about one's work, to develop the experimental attitude, and to encourage growth is far more likely to contribute to the progress of industry through his teaching than is the mechanic who is paid for production and not for teaching. This, in large measure, is the reason that, since the beginning of the scientific age and modern industry, industrial society has turned increasingly to the schools to train those who work in industry.

The vocational school can never be a fully satisfactory substitute for apprenticeship. Vocational education and training cannot be completed in school. This is as true of the preparation of those who enter the learned professions as of those who become industrial workers. Part of one's preparation must be obtained on the job. The school has been unable to provide or to simulate the psychological conditions of production work as they exist in actual vocational activity. The tensions, competitions, standards of achievement, and consequences of failure are of a different character in the school from those on the job. The school has tried to provide the atmosphere of industry by adopting "production methods" of class organization, equipment arrangement, the meeting of industrial standards of accuracy and speed, and by various other devices, but it invariably fails. It is well that it does fail, for if the school succeeded, it would probably fail in its special function of providing orderly, careful, and pedagogically sound instruction. Experience has shown clearly that it is not the function of the trade or industrial school completely to supplant apprenticeship. Its function is rather to go beyond apprenticeship and provide those phases of instruction that apprenticeship is not able to provide effectively. The school is concerned with developing those habits of thinking and of attacking work that characterize the growing, thinking worker. It is interested in character development as an aspect of vocational achievement and in the growth of desirable occupational attitudes—attitudes toward work, achievement, fellow workers, employers, and toward the vocation in which the worker is engaged. It is interested in the growth of a sense of responsibility to society that is being served by the trade the learner is studying. The school is concerned with developing basic skills and technical knowledge and must have time to teach *why* as well as *how*. All this takes planning and teaching skill, and the processes cannot be hurried. Hence, it seems clear that the school should not attempt to reproduce wholly the conditions that exist in industry, where the school's functions cannot properly be performed.

Because the school cannot complete the training of a craftsman or other industrial worker, apprenticeship is essential in the total process of industrial education. It is the function of apprenticeship to train in the special applications of the basic skills and technical facts learned in the school and, through repetition of processes, to develop skill to the desired level of the first-class mechanic. But perhaps more important than these functions is that of exercise in the discipline of continuous effort over long periods of time under the pressure of production conditions. It is here that the school does least in the preparation of the worker. This phase of the worker's education and training can be obtained only on the job. Apprenticeship also plays the role of initiating the young worker into his trade. He, for the first time, is able fully to identify himself as a member of the craft. He becomes a fellow worker with the journeymen of his trade, and in a manner that is impossible while in the school, he acquires the feeling of "belonging" to his vocation. As the importance of versatility and the possession of technical knowledge become increasingly urgent in modern industrial life, it grows increasingly clear that an adequate training for successful work and continuous growth in any but the lowest levels of industrial work necessitates both school training and apprenticeship training. Both are often needed also after one has become established in his vocation and desires to advance in rank or to change his specialty to a more satisfactory one. The school and apprenticeship supplement each other, and both should be included in any scheme of industrial education. It is important that they be so related in function and duration as to produce the best results.

Apprenticeship was not only man's earliest form of industrial education, but until very recent times it was his only means of training for the production of useful things. Over the thousands of years of its history it has passed through many stages of development, whether it is considered as a method or as a social institution. With primitive man it probably began as an unconscious process of imitative learning. Later it became an incidental learning and teaching aspect of the ordinary primitive daily existence. In early historical ages it seems to have become merged in the custom of the adoption of sons by craftsmen, and later appears as a recognized contractual relationship between craftsman and parent, or master, of the learner. In the late Middle Ages it became the most important educational agency of the people of the towns and reached its highest degree of complexity and importance as an institution. It then became an institution of the state in sixteenth-century England and in seventeenth-century colonial North America. It has passed through periods of social recognition and periods of neglect, but it has always played a major role in industrial education and is today of vital importance in the training of those who work skillfully in industry.

Importance of the History of Apprenticeship. To be able fully to understand the problems of industrial education in the modern world one needs to be acquainted with the background of those problems. As one examines their origins, it becomes clear that most of them derive from the disappearance of genuine apprenticeship of the type developed by the medieval trade guilds. It seems likely that, if the manufacturer produced by the industrial revolution had been able to exercise a like intelligent interest in the training of skilled workers that the master craftsman of the sixteenth century exhibited, many of the modern problems of industrial education would have been solved long ago. It is evident, however, that he not only did not possess the master craftsman's personal interest in the careful training of the young worker, but he failed to appreciate its importance to his own interests and to the advancement of industry. It is clear now that any successful handling of industrial education, of necessity, requires full cooperation among the three elements that invariably are involved, namely, the employer, labor, and the school. Very early in the history of modern industry, however, there began to be open warfare between industry and labor and the role of the school was largely ignored, or else the school stubbornly refused to play its part in the process of training the skilled industrial worker. It is interesting in this connection to observe the functions of the medieval master craftsman. He was at once employer, official representative of organized labor, and teacher. He discharged all the three essential functions in any adequate apprenticeship training, namely, those of the employer, of labor, and of the school. The fact that all three functions inhered in one person, the master, is doubtless the key fact explaining the extraordinary success of medieval apprenticeship as a means of industrial education. After the industrial revolution these three functions were sharply separated, and they have never, since the beginning of the factory era, been fully reunited in an effective form. It is probable that industrial education will not reach a high level of proficiency and adequate adjustment to modern conditions until a workable scheme is found of reuniting the training functions of industry, labor, and the school in a manner that is in keeping with modern economic and social conditions.

A careful study of the development of apprenticeship among ancient civilizations, with special reference to its relationship to the economic and social conditions of the eras in which it existed, and a similar examination of its character in medieval and early modern times throw much light upon the modern problem of industrial training needs and procedures. It is helpful to observe the factors in the problem that have existed from the beginning and the principles that underlie the problem without regard to changes in time or methods of industrial production. It is equally important to observe weaknesses and failures and to assess their causes. As one delves more deeply into the history of the earliest forms of industrial education, one is impressed by the fundamental sameness of the basic factors of success throughout the history of civilization. It is easy to make costly mistakes in developing modern programs of industrial education by becoming too greatly influenced by the superficial differences between modern and early conditions of the problem and by failure to be constantly aware of the unchanging fundamentals of the problem. New techniques, new approaches, new interpretations, and new adaptations of basic elements are, of course, essential; but it is always helpful in such cases to be aware that one is not creating something that is wholly new, but is merely adapting old basic processes to new situations. It is, therefore, time well spent by the industrial educator, the labor leader, or the student of the problem of modern industrial training of whatever status to familiarize himself with the history of industrial apprenticeship.

Summary and Conclusions. Apprenticeship, whether regarded as a method of teaching and learning or as a social and economic institution, is of very early origin and has a long and interesting history. As a method it is the first means of instruction in the industrial skills, and as an institution the oldest form of industrial education to be recognized by society. In those eras of history characterized by sharply stratified social organization and dominated by tradition and a prevailing desire to maintain the *status quo* it was wholly adequate as a means of transmitting needed skills and technical knowledge. After the birth of democracy and the scientific age, when man began to be more intent on the future, new ideas, new things, and new methods than on perpetuating the ideas and procedures inherited from the past, apprenticeship needed increasingly to be supplemented by organized instruction designed to promote inquiry, experimentation, and invention. New methods of industrial production following the advent of the factory era caused industrial apprenticeship to decline in importance for a time till its fundamental quality was more fully recognized. Today it is clear to leaders of industrial education that neither school training alone nor apprenticeship alone is fully adequate as a means of industrial education. It is also clear that the methods of teaching and learning that characterized apprenticeship when it was at its highest level of effectiveness during the eras of handicraft production are as fundamentally sound and necessary in the modern industrial education of skilled workers as they were then. Modern industrial education is but a present-day adaptation of the essentials of historic apprenticeship.

QUESTIONS AND ASSIGNMENTS

1. Explain the distinction between apprenticeship as a method of teaching and apprenticeship as an institution.
2. Contrast the advantages and deficiencies of school industrial education with those of apprenticeship.
3. What types of schools or classes are used today to supplement the training acquired in apprenticeship.
4. What is meant by the statement that apprenticeship is the "normal human method of transmitting skills"?
5. Why is some form of apprenticeship necessary to complete the preparation of a learner for work in a vocation?
6. How do you account for the slow development of apprenticeship in the United States since the beginning of the factory era?

7. Why is a knowledge of the history of apprenticeship necessary for an adequate understanding of the problems of industrial education in the modern world?
8. What are the basic elements of medieval apprenticeship that must be found in modern programs of industrial education if these programs are to be fully adequate?

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Chapter 3

ANCIENT FORMS OF APPRENTICESHIP

Modern apprenticeship can trace its lineage in an almost unbroken line to the very beginnings of civilization. The written records are not continuous throughout history, but other evidence of the existence of apprenticeship in the crafts makes it reasonably certain that apprenticeship has had an uninterrupted history to the present. By the time the historic period was reached in the growth of civilization the trades had become highly complex and specialization in the arts was well-developed. Trades were clearly differentiated, and there is some evidence of organizations among craftsmen in very early times. Since there was a well-defined tendency toward rigid hereditary social and economic stratification of society in nearly all ancient civilizations, the natural and expected practice was for a father to teach his son his own occupation. A son was expected to follow the footsteps of his father in all phases of life, to honor his memory, and to perpetuate his vocations and offices after his death. Westerman says that "throughout antiquity the tendency toward the inheritance of a trade from father to son is quite marked."[1] Anderson quotes Plato as saying, "The sons of the craftsmen learn their father's trade so far as their father and his friends can teach it." He also cites from Plato's *Republic* the lines, "Did you never notice how the potter's boys look on before they touch the wheel? And shall potters be more careful in educating their children and in giving them the opportunity of seeing and practicing their duties than our guardians will be?"[2] The phrase in Plato's statement, "and his friends," suggests that there may have been some sort of craft guilds or organizations in his day. The father-son relationship was a characteristic feature of apprenticeship throughout its history till the rise of state apprenticeship in the sixteenth century.

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[1] Westerman, W. L., *Classical Philology*, Vol. IX, p. 610. (Publication data for abbreviated book references will be found in the bibliography at the end of each chapter.)

[2] Anderson, F. L., "Some Facts Regarding Vocational Training among the Ancient Greeks and Romans," *The School Review*, Vol. XX, 1912, p. 195.

An interesting phase of the history of apprenticeship among early civilizations was the adoption of sons by craftsmen. The adoption of sons was a common practice among early peoples, a practice recognized in nearly all ancient codes of law. Originally, the practice had its chief significance in religious beliefs and customs. In the Hindu laws it was written: "He to whom nature has denied a son can adopt one, so that the funeral ceremonies may not cease,"[3] for it was the duty of a son on all sacred occasions to do honor to the spirit of the departed father. The Greeks had a similar attitude toward the adoption of sons. In the trial of a case involving the legitimacy of a son's adoption, an Athenian orator made the plea that "Menecles did not wish to die without children; he was desirous of leaving behind him some one to bury him and in after time to perform the ceremonies of the funeral worship."[4]

A Possible Transition Form of Apprenticeship. The outstanding statement upon which nearly all students of the history of apprenticeship base their conclusions regarding the earliest customs and law is that regarding the adoption of sons by artisans which occurs in the Code of Hammurabi (2285–2242 B.C.). This code, in the midst of several laws regarding adoption, states that "if an artisan has taken a son to bring up and has caused him to learn his handicraft, no one has any claim. If he has not caused him to learn his handicraft, that nursling shall return to his father's house."[5] This seems generally to be accepted as evidence of a well-recognized institution of apprenticeship in which, through the forms of adoption, a boy was indentured to a master craftsman. Since the code was a compilation of laws and customs recognized by the common law, it is probable that at the time of the codification the practice was well established. Douglas describes this form of adoption as an apprenticeship with a "blood fiction" created which made the term of apprenticeship continue through life.[6] The *Encyclopaedia Britannica* (Babylonian Law) states that "a craftsman often adopted a son to learn the craft. He profited by the son's labor. If he failed to teach his son the craft that son could prosecute him and get the contract annulled. This was a form of apprenticeship and it is not clear that the apprentice had any filial relation." The two sentences quoted from the code form the basis of several other descriptions of ancient apprenticeship, but for this early period of history it is doubtful whether some of the details in these descriptions are justified. It seems clear, however, that the adoption of sons by craftsmen had as part of the motive the perpetuation of the craft, and this form of transmission of the secrets and skills of a mechanic's occupation is much like that of the later type of indentured apprenticeship. The practice indicated in the Babylonian code may, perhaps, be regarded as at least a transition stage in the development of apprenticeship from the father-to-son method of passing down handicrafts to the genuine apprenticeship involving a written indenture and a definite period of training, after which the boy is released by the master to practice the craft independently.

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[3] Fustel de Coulanges, Numa Denis, *The Ancient City*, p. 68.

[4] *Ibid.*

[5] "The Code of Hammurabi," trans. by C. H. W. Johns.

Writing of a somewhat later period of Babylonian and Assyrian history, Johns shows that the apprenticing of slaves was common practice. He says: "We have many examples of slaves who were skilled artisans. They had been taught a handicraft. Later we shall come across cases of apprenticeship of slaves to learn a craft. But all artisans were not slaves. Indeed, some of the craftsmen, as goldsmiths, silversmiths, carpenters, were wealthy persons."[7] Referring to the apprenticing of slaves to learn a trade, Johns says that "the person to whom the slave was apprenticed was usually a slave himself. The owner of the slave gave him up to the teacher for a fixed term of years, differing in different trades. He had to furnish a daily allowance of food and a regular supply of clothing. At the end of the term, the slave might remain with his teacher on the payment of a fixed *mandattu*, or income, to the owner. Penalties were fixed for neglecting to teach him properly. The trades named are weaving, five-year term; baking, a year and a quarter; stonecutting, four years; fulling, six years; besides others not yet recognized."[8] It is from ancient Egypt, however, that we are able to obtain the clearest picture of apprentice practices in the ancient world.

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[6] Douglas, Paul H., *American Apprenticeship and Industrial Education*, p. 13.

[7] Johns, C. H. W., *Babylonian and Assyrian Laws, Contracts and Letters*, New York, Charles Scribner's Sons, 1904, p. 173.

The Papyri Indentures. The discovery of written, legal indentures in the tombs and piles of ancient rubbish in Egypt has removed all possible doubt as to the existence in Egypt of a genuine apprenticeship almost identical with that of the medieval period in Europe. Nine of these which have been translated and published show clearly the character of the relationship between master and apprentice and reveal other important facts in regard to the recognized method of teaching the arts to the boys of that time. These indentures have to do with the weaving trade, nail making, flute playing, shorthand writing, and hairdressing and range in their dates from one written in 18 B.C. to one in the third century A.D. Other contracts indicate a custom of binding out a son, or a slave, to a craftsman in payment of interest on a debt. In these contracts the craftsman is required to teach the son, or the slave, his trade. Such agreements are very different, however, from the indentures of apprenticeship in that the purpose of the contract, it appears, is to satisfy a craftsman creditor by means of the labor of the son, or slave, and is not to learn a trade. Other recovered papyri show that apprenticeship was also used in teaching the reading and carving of hieroglyphs.[9]

Egyptian Apprenticeship. Of chief interest, however, are the nine genuine indentures of apprenticeship. These reveal that in Egypt no fixed period of apprenticeship was required, the term of months, or years, being wholly a matter of agreement between the contracting parties. In the seven of the nine indentures in which the terms of apprenticeship can be found the following terms are given: (1) a weaver's apprentice, one year; (2) a weaver's apprentice, two years; (3) a weaver's apprentice, two years; (4) a weaver's apprentice, five years; (5) a hairdresser's apprentice, three years; (6) a flute player's apprentice, six months; (7) a shorthand writer's apprentice, two years. There does not seem to be any relation between the number of years of service and the particular craft learned since the term is different even in the same craft, as is shown in the case of the weavers' apprentices. According to the contracts of the weavers, the nail maker, and the hairdresser, the masters had to pay for the food and clothing of the apprentices and, in addition, pay wages which varied according to the skill of the learners; and they agreed, in further return for the labor of the apprentices, to teach their trades to them. In the case of the flute player and the shorthand writer, however, the master was to receive payment for his teaching. Since the two kinds of contract differ considerably in form, it has been thought by some students of these papyri that they referred to wholly different relationships, one kind of indenture being only a teaching contract, while the other was a genuine indenture of apprenticeship.[10] Westerman, however, thinks that the difference is due chiefly to the economic factors involved, namely, that the flute player and shorthand writer could not profit by the work of their apprentices till they were near the end of the term of service and had become sufficiently skillful to practice their arts for money, whereas the apprentices of the artisans in such crafts as weaving and nailsmithing could begin to be profitable to their masters from the first. Though these agreements differ in form in several particulars, they all recite, in some detail, the obligations of the contracting parties in regard to food, clothes, lodging, wages, the term of service, fines for breach of contract, taxes of apprentices, obedience to masters, lost time, obligation of the master to teach, and the observance of holidays. They are apparently most carefully drawn in legal form and are signed by both parties to the agreement. They differ very little in essential points from the forms of many modern indentures.[11]

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[8] *Ibid.*, pp. 181–182.

[9] See Westerman, *op. cit.*, pp. 297–304.

Age of Apprentices. The age at which boys began their apprenticeship varied considerably since there was no control of apprenticeship or the trades by either craft guilds or statute laws. It was wholly a matter of bargaining between the father of the boy or master (if the boy was a slave) and the craftsman. Westerman indicates that a usual age of beginning apprenticeship was about thirteen, but there is evidence that boys began at a much earlier age than that. In Egypt today very young children are started in shops as apprentices. Unlike medieval apprentices the early Egyptian apprentices seem to have lived at their parents' home, though the craftsman with whom they worked paid for their food and clothing. Such arrangements, however, were not uniform but depended upon the agreement made at the time the contract was signed.

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[10] *Ibid.*, pp. 296–299.

[11] *Ibid.*, pp. 297–314.

Greek and Roman Apprenticeship. Records of apprenticeship practices among ancient Greeks and Romans are discouragingly meager, but those now available clearly show, as was true among other early civilizations, that apprenticeship was generally the chief means of industrial education. The intellectuals, for the most part, were contemptuous of those who worked with their hands. Their attitude, which is more or less characteristic of intellectuals in all periods of history, was, among the Greeks and Romans, probably also due to the fact that much of the mechanical and other manual work was done by slaves. Yet it is evident that they were thoroughly familiar with apprenticeship practices and were interested in it as a commonly accepted means of training the youth of the laboring classes. It is interesting that practically all that is known today about ancient apprenticeship is in the writing of the intellectuals. Their attitude toward the manual worker is indicated in such expressions as that of Aristotle (384 B.C.–322 B.C.) who said, "No low mechanic ought to be admitted to the rights of a citizen, nor any other sort of people whose employment is not productive of virtue." And Xenophon (434 B.C. [?]-355 B.C. [?]) said, "The arts that are called mechanical are also, and naturally enough, held in bad repute in our cities. For they spoil the bodies of workers and of superintendents alike, compelling them to lead sedentary, indoor lives, and in some cases even to pass their days by the fire. And as their bodies become effeminate, so do their souls become less robust. Besides this, in such trades one has no leisure to devote to the care of one's friends or of one's city. So that those who engage in them are thought to be bad backers of their friends and defenders of their country."[12]

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[12] Anderson, *op. cit.*, p. 191.

However, as Anderson points out, not all famous men of the Greeks assumed such an attitude, and he quotes Pericles (495 B.C.–429 B.C.) from the Funeral Oration: "To avow poverty is no disgrace, the true disgrace is to do nothing to avoid it. An Athenian citizen does not neglect the state because he takes care of his own household; and even those who are engaged in business have a very fair idea of politics."[13]

That the great men of Greece were familiar with the details of the life of the mechanic and the apprentice is shown in their use of illustrations from that life and in their opinions about the work of mechanics. Xenophon (434 B.C.[?]–355 B.C.[?]) described the high degree of specialization of his day as follows: "In great cities, because there are numbers that want each particular thing, one art alone suffices for the maintenance of each individual; and frequently, indeed, not an entire art, but one man makes shoes for men, and another for women; sometimes it happens that one gets a maintenance merely by stitching shoes, another by cutting them out, another by cutting out upper leathers only, and another . . . by simply putting together the pieces."[14] Plato several times in his writing shows his interest in, and knowledge of, the life and work of the mechanic and the apprentice, as indicated in quotations given above from his works. He also gave some thought to the desirability of vocational specialization among mechanics. He considered it unwise for any one to try to practice more than one occupation. In concluding his remarks on this point, he said, "Let this then be our first principle in the state; no one who is a smith shall also be a carpenter, and if he be a carpenter he shall not superintend the smith's art rather than his own."[15] The paucity of records pertaining to Greek and Roman apprenticeship should in no wise lead to the conclusion that it was not recognized as an important institution of the common life, but rather that it was so generally taken for granted as the normal means of training craftsmen that it would not occur to the intellectuals who wrote the books to make it a subject of special attention. It is only when a social institution is failing to meet society's needs, or for some other cause becomes a subject of special interest, that men write about it in books. A further reason for the lack of more adequate records of apprenticeship is the fact that much of the work of craftsmanship was done, throughout the ancient period, by slaves who were not regarded as citizens.

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[13] *Ibid.*, p. 192.
[14] *Ibid.*, p. 193.
[15] Plato Laws 846, 847.

Roman Apprenticeship. Extremely little specific reference to apprenticeship is available from ancient Rome. It is known that there were many craftsmen and they learned their trades by means of apprenticeship, but, for the most part, students of Roman history are left to conjecture concerning the details of apprenticeship practices. One bit of evidence suggests that apprentices sometimes began their service at a very early age. Anderson mentions an epitaph on the tomb of a slave who died at twelve years of age that says, "He was the joy of his master and the pleasing hope of his parents. With his trained hand he knew well how to fashion jeweled necklaces and to place all kinds of gems in a golden setting."[16] Obviously he must have begun his training at a very early age. It is known that craftsmen of Rome had numerous organizations, though it seems that these corporations were formed primarily for political, social, or religious purposes. There is no specific evidence that they controlled apprenticeship practices or trade standards. One can only surmise that they did because of the character of medieval guilds that had similar basic purposes and that did give much attention to the control of apprenticeship and standards of craftsmanship. Interestingly enough, there is a bit of evidence that there were apprentice organizations also.[17] It is also interesting to find that in both Athens and Rome there were vocational schools for the training of cooks, whose craft was held in high regard probably because of the great popularity of banquets among the wealthy classes and the love of fine foods that in many cases reached the stage of a vice comparable to that of the excessive drinking of wine, which was also prevalent.

Legal Status of Apprenticeship. The uniform silence of statutes in regard to apprenticeship has led some to conclude that a legal form of the institution did not exist in the ancient world. Frequent mention in records, however, of apprentice taxes and the evidence presented earlier in this chapter indicate that the practice of apprenticeship was generally recognized in common law. In reference to the Egyptian practices, Westerman observes that "in the present state of evidence one can only conclude that the apprenticeship system of Roman Egypt was a widespread institution based upon contract which was recognized and enforced by the common law rather than by any formal enactment."[18] The silence of the statute laws suggests its widespread practice as a matter of private agreement enforceable under the common law. That apprenticeship existed cannot be doubted, and the nature of the institution implies its recognition in common rather than in statute law.

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[16] Anderson, *op. cit.*, p. 198.

[17] *Ibid.*

Summary and Conclusions. Apprenticeship, whether regarded as a method of training or as a legal institution, is much older than is commonly supposed. The custom among early people that required a father to teach his craft to his son probably led to the practice of indentured apprenticeships. An intermediate step, perhaps, was that of the adoption of sons by craftsmen. The final phase was reached when boys were taken by the craftsman for a period of months or years for the purpose of teaching them his craft in exchange for their labor, or for pay. The few indentures remaining from the ancient world indicate that the term of apprenticeship was not uniform but varied according to individual agreements. It seems clear that apprenticeship agreements were enforceable under the common law and were not recognized in statute law. That apprenticeship was widespread and had a continuous history seems to be well established. The fact that relatively few references to apprenticeship appear in written records is probably due, in part, to the widespread practice in ancient civilizations of using slaves for much of the mechanical work. However, it is clear that craftsmen in certain of the trades were men of means and importance in the towns. The ancient Egyptian indentures that have remained to the present day make clear the character of apprenticeship in Egypt during the first century B.C. and the first two centuries A.D. The similarity of these papyri indentures to those of medieval times, as well as to modern contracts of apprenticeship, indicates the unchanging character of the essential features of the institution of apprenticeship.

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[18] *Ibid.*, p. 197.

QUESTIONS AND ANSWERS

1. What is the probable reason for the almost complete ignoring of apprenticeship by the statute laws of ancient nations?
2. How do you account for the attitude of the intellectual classes of ancient Greece toward the mechanical trades?
3. Explain why it seems probable that the adoption of sons by craftsmen, as indicated in the Code of Hammurabi, was a transition stage in the history of apprenticeship between the early practice of father-and-son apprenticeship and the later indentured apprenticeship.
4. How do you account for the fact that there was no uniform practice among ancient peoples with reference to the age of beginning apprenticeship, the term of service, and other provisions of apprenticeship agreements?
5. What is the value of a knowledge of ancient apprenticeship to the industrial-education leader of today?

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Chapter 4

RISE AND DECLINE OF MEDIEVAL APPRENTICESHIP

Reappearance of Indentured Apprenticeship. That there ever was a time when some form of apprenticeship as a method of training for the crafts did not exist is highly improbable, but all records of apprenticeship as a recognized social and economic institution seem to have disappeared sometime in the early part of the Christian Era not to reappear until the closing years of the eleventh century or the beginning of the twelfth. Of the intervening period nothing now is known that proves beyond question that an indentured apprenticeship existed in Europe. In the eleventh century, craft guilds made their appearance, and since indentured apprenticeship was a characteristic feature of the later craft guilds, it is probable that it existed in some form among the earliest of these guilds. Little is known, however, about the earliest craft guilds, and no definite references to indentured apprenticeship appear in the records till a much later period. The craft guilds appeared very slowly and did not become powerful in city affairs until the fourteenth and fifteenth centuries, when they seem to have superseded in importance the older and more comprehensive merchant guilds. It seems that the reappearance of indentured apprenticeship was very gradual and that it did not become an important factor in economic life until the period of the supremacy in town life of the craft guilds.

Development of European Apprenticeship. The guild apprenticeship of the Middle Ages and the early modern period resulted from a very slow process of evolution. The practices often described by modern writers as characteristic of the period were not common during the early years. The process by which a boy became a journeyman or master varied greatly at different times and places. There is no evidence that complete uniformity of practice ever existed. Even after the passage of the famous Elizabethan Statute of Artificers (1562) that sought, among other benefits, to enforce uniform restrictions on the practice of a trade in England, there was a constant evasion of the provisions of the law as it applied to apprenticeship, and its enforcement was never uniform throughout England. It seems clear also that in England, at least, the serving of the customary seven years of apprenticeship was not the only method by which a young man might become a journeyman or master. Two other very common methods before the enactment of the Statute of Artificers were patrimony and redemption.[1] Patrimony, or the obtaining of freedom by inheritance, was doubtless of very ancient origin, and it seems to have been merely the adaptation to guild conditions of the time-honored custom of the handing down of a craft from father to son. There is evidence to show that this practice did not cease in England even after 1562, and it is probable that there never was a time when the son of a guild member did not enjoy special privileges in the matter of becoming a master. The purchase of the freedom of the craft, or the redeeming of part of the period of service by the payment of a sum of money, a practice known as redemption, was also quite common during the major part of guild history. Scott says that "many instances of admission to guild membership by redemption in the fourteenth century and later might be given. Indeed, the practice seems to have persisted in some places throughout the whole history of the guilds and livery companies."[2] He also observes that "apprenticeship never became in all guilds the sole road to the position of master." This does not mean, however, that apprenticeship was not the usual way to the freedom of the trade. In the records of the early craft guilds there is evident a strong desire to uphold the honor of the craft by requiring a high type of workmanship and strict standards of honesty in dealing with customers.[3] The chief means of ensuring these high trade standards was a long, carefully supervised training through apprenticeship. The early guild records clearly testify to the fact that the earlier apprenticeship requirements were largely based upon this worthy motive. At a later period, however, it is clear that the chief purpose of the insistence on a seven-year apprenticeship, restrictions as to place of birth, and high fees for the granting of freedom after the period of apprenticeship, was to protect the guilds from the competition of craftsmen coming in from other towns, to bolster up the declining prestige of the guilds by restricting the number of craftsmen, and to fight the rapid growth of the new domestic system of production, which later played so large a part in the final destruction of the old guilds.

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[1] See Scott, Jonathan F., *Historical Essays on Apprenticeship and Vocational Education*, for discussion on this point.

[2] *Ibid.*, pp. 7–8.

[3] See, for example, Lambert, J. Malet, *Two Thousand Years of Guild Life*, Chap. 32.

Character of Medieval Apprenticeship. Notwithstanding the varying apprenticeship practices in different countries and cities and the many irregularities and abuses appearing in the history of the guild regulations, the medieval institution of apprenticeship was, for its time, an excellent means of education. It flourished during a period when government was weak and uncertain and society was not strongly organized. Its restraining, directing, and teaching functions were invaluable at such a time in the history of Europe. It also included much of the spirit of the father-and-son relationship and much of the atmosphere of home training. The apprentice usually became a member of his master's household and shared alike in the work and the social life of the master's home. His position was far different from that of a modern industrial worker, for he belonged to the same social class as his employer and was constantly under his instruction. The supervision by the master extended to every phase of the apprentice's life. Seligman gives as the provisions of an indenture of 1409 that "the apprentice is to keep his master's secrets, do him no injury nor commit excessive waste of his goods. He is not to frequent taverns, commit fornication or adultery with the housemaids or in town, nor betroth himself without his master's permission. He is not to wear certain garments, play at dice, chequers, or any other unlawful game, but is to conduct himself soberly and piously as a good and faithful servant, or in default to serve double time. The master, on the other hand, agrees to find him in all necessaries, food, clothing, bed, and so on, for four years. In the fifth year he finds himself, but receives twenty shillings and the tools of the trade; and in the sixth year he gets forty shillings but finds his own tools. The master agrees on his side to teach him the craft without concealment."[4] Though the social life of the Middle Ages was generally characterized by moral laxity, the apprentice was required to live by rules aiming at the highest standards of the community. Not only was he given general schooling, religious instruction, and training in the skills of his craft, but the highest ideals of workmanship and business integrity were held up to him by his master who was ever concerned for guarding the "mysteries" and the excellences of his art. This was particularly true of the earlier period of guild apprenticeship. The skill of the craftsmen trained under this system of industrial education is attested to by many beautiful buildings and numerous skillfully wrought objects of fine craftsmanship of all sorts remaining to us from the Middle Ages. As to the effects of the moral and religious training afforded, it needs only to be pointed out that the master craftsmen for centuries constituted the substantial, conservative element of the social, political, and economic life of the towns. These masters were the products of guild apprenticeship.

Term of Apprenticeship. In those cities where the craft guilds were well developed and powerful at about the close of the fifteenth or the early years of the sixteenth century, apprenticeship had taken on the form usually described without qualification as "medieval apprenticeship." In such places, with variations as to the details, a boy was indentured by his parents or by his guardian to a master mechanic for a period of years. This period was usually seven years in England, though rarely so long in Continental Europe. The boy was bound to work for the master, live in his home, be obedient, and keep secret the mysteries of the craft. The master agreed to feed, clothe, and instruct the boy. The instruction sometimes included a certain amount of elementary general education, morals, and religion, as well as the mysteries and skills of the craft. At the end of the period of apprenticeship the boy was given an examination to determine whether he was sufficiently versed in the secrets of the craft and sufficiently skillful in its work to be recognized as a journeyman, or day worker, as the name originally meant. When he became able to pay the necessary fees and to set up an establishment of his own, he might become a master. The municipality often took official notice of the last step, and the mayor granted the freedom of the craft to the new master. It is practically impossible to find two towns where the procedure in passing from indentured apprentice to master craftsman is identical. The intermediate step of journeyman was, in the early years of the craft guilds in England, not required. The three distinct stages were much more clearly defined on the Continent, where a second examination at the end of a period of journeymanship was usually required before the worker became a master.

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[4] Seligman, Edwin R. A., "Medieval Guilds of England," *Publications of the American Economics Association*, Vol. II, No. 5, pp. 87–88.

Growth and Destruction of Craft Guilds. Gradually, with the rise of the medieval towns, the freeing of the serf-mechanics, and the need for the protection of the workers against more powerful neighbors and foreign itinerant workers, the guilds grew up. They developed slowly and unequally with varying regulations and customs. They rose to a dominant position in the economic life of Europe, then as gradually died out and finally disappeared. They began to decline when trade beyond the borders of the town grew to large proportions, requiring great quantities of products to be shipped to distant places. Some of the more wealthy masters became merchant-adventurers or entrepreneurs who secured orders for the shipment of manufactured goods to other cities or to distant colonies. To do this it was necessary to obtain capital with which to buy material and pay for labor. This very soon led to a new domestic system of production wherein parts of big orders for manufactured goods were farmed out to different masters, or to journeymen, to work up in their homes or shops, all working for the entrepreneur. In time the manufactory, or large workshop, appeared. This enabled the merchant-adventurer to bring together a large number of mechanics to work on his orders under his personal direction and supervision. This type of industrial organization inevitably led to an ever-increasing division of labor and the resultant temptation to employ those who were not thoroughly trained in all phases of a trade. It was this system which ultimately destroyed the influence of the craft guilds and, after the advent of power-driven machines, emerged as the factory system of production.

Destructive Factors. As the disintegrating influences grew in strength during the sixteenth, seventeenth, and eighteenth centuries, innumerable disputes and lawsuits arose between the guilds and the industrial enterprisers who were carrying on the trades in violation of guild rules and employing journeymen who had not served complete apprenticeships. The efforts strictly to enforce guild regulations in many English towns soon drove the new type of merchant-manufacturer to the rural districts, where many journeymen, unable to set themselves up as masters, soon followed to find work. In time new cities grew up without guilds to interfere with domestic work and the growth of manufactories. Numerous laws were passed to check the migrations from the towns to the country and to restrain the new system of industry. Other economic disturbances of a most serious nature in the sixteenth century, such as the fall in the value of money and the increase in the number of enclosures of farm lands, with the resulting eviction of many farm tenants, served to flood the country and towns alike with cheap labor and to make the growth of the domestic system of production easy and the enforcement of guild apprenticeship increasingly difficult.

Statute of Artificers. In 1562, after many years of piecemeal legislation designed to remedy various abuses in regard to apprenticeship and other related phases of industry, the famous Statute of Artificers and Apprentices was passed by the English Parliament. This statute of Queen Elizabeth's reign, "containing divers orders for Artificers, Laborers, Servants of Husbandry, and Apprentices," states grandly that "although there remain and stand in force presently a great number of Acts and Statutes concerning the retaining, departing, wages and orders of apprentices, servants and laborers, as well in husbandry as in divers other arts, mysteries and occupations, yet partly for the imperfection and contrariety that is found, and doth appear in sundry of the said laws, and for the variety and number of them, and *chiefly* for that the wages and allowances limited and rated in the said

Statutes, are in diverse places too small, and not answerable to this time respecting the advancement of prices of all things belonging to the said servants and laborers, the said laws cannot conveniently, without great grief and burden of the poor laborer and hired man be put in due execution; and as the said several Acts and Statutes were at the time of making of them, thought to be very good and beneficial for the commonwealth of this realm (as divers of them are); so if the substance of as many of the said laws as are meet to be continued, shall be digested and reduced into one sole law and statute and in the same an uniform order prescribed and limited concerning the wages and other orders for apprentices, servants and laborers, there is good hope that it will come to pass that the same law, (being duly executed) should banish idleness, advance husbandry, and yield unto the hired person, both in the time of scarcity and in time of plenty, a convenient proportion of wages."[5]

This all-inclusive and ambitious piece of legislation is unique among economic measures. It attempted at one stroke to solve not only the vexing problem of apprenticeship regulation but also most of the other troublesome economic difficulties of the day. It limited materially the group of boys eligible for apprenticeship in the crafts, fixed seven years as the period of apprenticeship in all trades, and attempted to check the growth of the domestic system of industry and the development of industries beyond the limits of the towns where guild regulations obtained. Scott, in summarizing the apprenticeship clauses of the statute, says: "No one could be an apprentice to a merchant unless his parents or guardian were possessed of a certain amount of property. A master in any one of certain specified trades must employ one journeyman if he had three apprentices, and for every other apprentice another journeyman. . . . More important than these restrictions, however, are the clauses limiting the right to take apprentices to householders in the town, and the right to be apprentices in the majority of occupations, to the sons of freemen of the municipalities who were neither laborers nor husbandmen. . . . Residents of rural districts were thus prevented from engaging in urban industries; no longer could they migrate to the towns, serve apprenticeships and set up in trade."[6] This law attempted to encourage agriculture, destroy idleness, develop the towns, and raise the standards of industry. It is extremely interesting, in many of its aspects, to the student of the history of economics, but its chief significance in the history of industrial education lies in the fact that it made possible the continuance of the institution of apprenticeship after the decadence of the guilds. It marks, too, the beginning of a new stage in the history of apprenticeship. After its passage the guilds slowly receded into the background, yet, as Bray states, "For more than two centuries, without amendment, the Act remained in force; and while it lasted it provided at least the possibility for the adequate training and supervision of the youth of the country."[7]

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[5] 5 Elizabeth C-4.

State Apprenticeship. Apprenticeship under the Statute of Artificers was, however, a quite different institution from the earlier guild apprenticeship. On the surface the two apprenticeships appeared very similar. Apprenticeship rules were enforced in both cases by special regulations in regard to entrance, period of service, and the obtaining of freedom. But it is clear that the second type differed in features which were fundamental. Under the guilds the personal relations between master and boy was a chief factor of its effectiveness, and the constant supervision by the guild, always jealous of its high standards of craftsmanship, ensured genuine training not only in the skills of the trade but in the character and general development of the boy as well. Under state direction the old personal relationship soon degenerated into that of employer and worker, and later, to that of exploiter of youth and of child laborer. The element of supervision and the jealous guarding of standards of craftsmanship and business integrity almost wholly disappeared. The law regulated by statutes, but it could not supervise and instruct. Notwithstanding the great significance of Elizabeth's famous law and the many economic consequences of its passage, it failed to reach even approximately its intended purposes, and there is much evidence that it was never well enforced. It was squarely in the path of progress and so out of tune with the trend of economic history during its existence that it served chiefly as an irritant and a cause of many abuses, some of which it was designed expressly to obviate. The compulsory apprenticeship features, the universal requirement of seven years of service, together with the oppressive Poor Law passed in 1601 which forced pauper children into apprenticeship, made available to the new domestic system and finally to the eighteenth-century factory system an enormous supply of cheap, unprotected child labor. Not many years after state apprenticeship and state compulsory labor for paupers supplanted guild apprenticeship, one of the worst forms of child labor the world has ever known grew up in England and later appeared in America.

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[6] Scott, *op. cit.*, p. 40.

[7] Bray, Reginald Arthur, *Boy Labor and Apprenticeship*, p. 16.

Disappearance of Craft-guild Apprenticeship. The craft guilds rapidly declined in England after 1562, and with the disappearance of their political influence and their control of apprenticeship, the traditional high standards of apprentice training were no longer enforced. Increasingly apprenticeship, indentured servitude, and pauperism came to be associated in the public mind. This unfortunate association of ideas came, in time, to have a marked effect upon the development of an effective apprenticeship in the later years of the American Colonies and in the early part of the history of the Republic. For nearly two centuries before 1562 apprenticeship had been the chief means of educating and training those who became the leading citizens of the towns, and state apprenticeship did not prove to be an equally effective means of education and training. Its disappearance was inevitable, however, under a new system of commerce and industrial production. The new government-controlled apprenticeship came at a time of economic confusion and the beginning of a new industrial period of which the British people were as yet but dimly conscious. As the new era slowly advanced, the craftsmen instinctively resisted the changes from established methods of production. The new class of merchant-manufacturers fought the old guild restrictions on production, and between the two opposing forces the old type of apprenticeship finally disappeared and there emerged in its place a form of industrial slavery for the young which retained only the names and forms of guild apprenticeship. Boys were still called apprentices, but they were not taught whole trades. They were still bound out by indentures, but there was no longer the traditional father-and-son relationship, and there was no longer any promise of some day attaining the freedom of the craft. Thus guild apprenticeship declined and died, never to be revived, for after its disappearance there occurred such a revolutionary change in industrial methods and organization that its reappearance became forever impossible.

Summary and Conclusions. Indentured apprenticeship, after disappearing from written records for several centuries, reappeared as an important feature of the craft guilds of the later Middle Ages. It was the chief means of guarding the standards of workmanship maintained by the guilds throughout their history. A full term of apprenticeship was, however, only one method by which one might obtain the freedom of the craft, two other methods being patrimony and redemption.

Apprenticeship was a most effective restraining and socializing agency during a period of European history when the social and political life was loosely organized. It was remarkably effective as a means of training for the skilled crafts and served to protect the guilds for many years against the encroachments of the new domestic system of production which finally played so large a part in their destruction. Medieval apprenticeship at its best was the most effective type of industrial education ever developed. It was for centuries also an important means of the general education of the men who controlled the European cities. With the advent of the commercial revolution that resulted from geographic discoveries and the establishment of colonies in distant lands during the sixteenth century the economic conditions that had given rise to the craft guilds disappeared and a new economic system sealed the doom of the guilds. With the gradual loss of prestige by the guilds and the rise of the entrepreneur and his large-scale production, guild apprenticeship as an institution had to go, and a new type of state-controlled apprenticeship was set up in its place. This new apprenticeship, similar in all outward aspects to the older form, kept apprenticeship alive for many years as a possible means of industrial education for youth. But it, in turn, degenerated into mere child labor and almost completely disappeared as an important factor in the training of mechanics after the coming of the Industrial Revolution.

QUESTIONS AND ASSIGNMENTS

1. What evidence is there to support the belief that some form of apprenticeship existed throughout the centuries between the fall of the Roman Empire and the earliest known written references to apprenticeship that appeared at the end of the eleventh century?
2. What is meant by "the domestic system" of industrial production? How did it affect guild apprenticeship?
3. What effect did the geographic discoveries and colonization projects of the sixteenth century have upon the craft guilds of Europe?
4. How would you justify the practice of patrimony as a means of becoming a master?
5. What do you regard as the most important features of guild apprenticeship?
6. What evidence is there to support the statement that guild apprenticeship was an effective educational agency?
7. What were the special features of guild apprenticeship that made it unadaptable to the factory system of production?
8. What are the essential features of guild apprenticeship that have been carried over into modern apprenticeship?
9. What was the effect of the English Poor Law of 1601 upon the popular attitude toward apprenticeship?
10. How do you account for the failure of the Statute of Artifices to accomplish its purposes?
11. How did the manufactory differ from the later-developed factory?

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Chapter 5

EARLY AMERICAN APPRENTICESHIP

Shortage of Skilled Labor in the Colonies. Throughout the colonial period of American history a major concern was the ever-present shortage of skilled labor. It is probable that this lack of skilled workers was as much a cause of the slow development of colonial manufactures as were the many restrictions placed upon the production of finished products by the British Parliament. The colonists constantly evaded the Parliamentary restrictions, but they were never able to find among their citizens enough trained workers to meet the ever-growing demand for such skilled labor. Clark, writing of the early years of colonial history, says, "At a time when the manufacturing operative was still an artisan, possessing the acquired skill and sometimes the secrets of an industrial art, his knowledge and training were primary requisites in introducing a new manufacture or maintaining an old one. Therefore, industrial education . . . was a subject of acknowledged public concern."[1] Many efforts, which were for the most part ineffective, were made to meet the need for trained labor. In 1640 Massachusetts directed the town authorities to consider "what course may be taken for teaching the boys and girls in all towns the spinning of yarn"; and Virginia, "for the better education of youth in profitable trades and manufactures," ordered that in Jamestown two public flax houses be built and that from each county two children be sent to be taught carding, spinning, and knitting.[2] In 1663 Virginia directed that a house be provided in each county "for the educating and instructing [of] poor children in the knowledge of spinning, weaving, and other useful occupations." The "Frame of Government" of Pennsylvania provided that "some useful trade or skill" be taught all children twelve years of age "to the end that none may be idle, but the poor may work to live and the rich, if they become poor, may not want."[3] The chief reliance, however, for providing skilled workers was apprenticeship. The main purpose of colonial apprenticeship was to increase the numbers of skilled workers and not to protect the standards of the crafts as was true of medieval apprenticeship.

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[1] Clark, Victor S., *History of Manufactures in the United States, 1607–1860*, Washington, D.C., Carnegie Institution of Washington, 1916, p. 67.

[2] *Ibid.*

English Apprenticeship Brought to America. It is a characteristic of all colonizing peoples that they attempt to establish in the new country the institutions with which they are familiar in the mother country. Only gradually are the old practices and forms modified by the new conditions of life. Such was the case with the English Colonies in North America. Notwithstanding that many of the forms of the colonial governments were, from the first, necessarily different from those of the home land because of the remoteness from the king and Parliament and because of the pioneer conditions to be met, the ordinary practices and activities of private life, the procedures of social and economic intercourse, had been merely transplanted from England to North America. Among these was the practice of apprenticeship as it was found in England at the time. The Statute of Artificers of 1562 and the Poor Law of 1601, which together controlled apprenticeship in England at the time of the founding of the American Colonies, were not continued by the colonies as statutes, but the English types of apprenticeship and poor relief fostered by these laws were generally used by the colonists.

New England, the Industrial Center. Conditions of soil, climate, and, to some extent, the type of colonist in the different sections of North America determined the character of the economic activities of the different colonies. Because of these factors New England became very early the industrial section, and it is therefore to the apprenticeship practices of the New England Colonies chiefly that one must look for the colonial background of American industrial education. From the first the New England town organization favored the exercise of the handicrafts, and it is in these towns that the greatest needs were found for the training of craftsmen. Very early, too, the Southern Colonies and in large measure the Middle Colonies specialized in agriculture and imported from New England and from England nearly all the necessary manufactured articles. This also resulted in the early stimulation of the handicrafts in the New England Colonies. One list of the craftsmen found in Boston in 1648 shows the following: "coopers, shoemakers, tailors, carpenters, joiners, glaziers, painters, gun-smiths, lock-smiths, black-smiths, naylers, cutlers, weavers, brewers, bakers, caster-mongers, felt-makers, braziers, pewterers, tinkers, rug makers, masons, lime, brick and tile makers, card makers, turners, pump-makers, wheelers, glovers, fell-mongers, and furriers."[4] All such crafts were carried on chiefly as household industries since there was little demand for the export of manufactured products during the early colonial period. However, the importance of these crafts, both in local community life and in the trading among the colonies, made necessary the building up of a continuous supply of trained mechanics, and apprenticeship was the means employed to accomplish this end.

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[3] *Ibid.*

General Character of Colonial Apprenticeship. The old craft guilds, no longer important in England at the time of the founding of the American Colonies, did not exist in the new country, and the traditions governing apprenticeship were those developed under statutory apprenticeship rather than the old guild system. Hence, the practices, as well as later legislation dealing with the matter, were based chiefly upon ideas of the welfare of the community, the needs of the children, and the supplying of the needed products, though due regard was had by the authorities for the protection of the reputation of the crafts. It is not surprising, therefore, to find very early that apprenticeship was regarded as an important means of education and that it soon became "not only . . . of fundamental social and economic importance, as in England, but it was the most fundamental educational institution of the period."[5]

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[4] Edward Johnson in *Wonder-working Providence of Sion's Saviour in New England, 1628–1651*, ed. by J. Franklin Jameson, New York, Charles Scribner's Sons, 1910, p. 248.

[5] Seybolt, Robert Francis, *Apprenticeship and Apprenticeship Education in Colonial New England and New York*, p. 22.

In the American Colonies as in England apprenticeship was regarded not only as the necessary and appropriate means of entering a trade but as a means of preventing pauperism and providing poor relief; hence, "all children 'not having estates otherwise to maintain themselves' were obliged to engage in some form of useful occupation."[6] The children of the very poor were bound out by the officials of the town, and the children of parents of moderate means voluntarily entered into apprenticeships. There were, therefore, two classes of apprentices, the voluntary and the forced. The former apprenticed themselves to masters who were qualified to teach them the trades they desired to learn, but the latter were, in the earlier colonial period, placed with those who could see that they did not become public charges, and little attention seems to have been given to the matter of vocational training. Later, when these children became the subject of further town and colonial legislation, masters were required to train them for some profitable occupation.

The Term of Apprenticeship. The term of apprenticeship in the colonies was the customary seven years and could not be completed by boys until they reached twenty-one years of age, and by girls until they were eighteen or married. There were occasional exceptions to the usual seven-year period before colonial legislation definitely fixed this term, but the practice was generally adhered to from the first. The idea that a shorter apprenticeship would be detrimental to the crafts was inherited from the old craft guilds. The English Statute of 1562, as well as later colonial legislation, bears testimony to the general acceptance of this notion. The following law passed by Boston in 1660 shows clearly the general attitude toward the traditional belief in the virtue of a seven-year training: "20th, 6th mo., 1660. Att a Towne's meeting. . . . Whereas itt is found by a sad experience that youthes of this town, being put forth Apprentices to severall manufactures and sciences, but for 3 or 4 yeares time, contrary to the Customes of all well governed places, whence they are uncapable of being artists in their trades, beside their unmeetness att the expiration of their Apprenticeship to take charge of others for government and manual instruction in their

[6] *Ibid.*, p. 23.

occupations which, if not timely amended, threatens the welfare of this Town. It is therefore ordered that no person shall henceforth open a shop in this Town, nor occupy any manufacture or science, till hee hath completed 21 years of age, nor except hee hath served seven years Apprenticeship, by testimony under the hands of sufficient witnesses. And that all indentures made between any master and servant shall bee brought in and enrolled in the Towne's Records within one month after the contract made, on penalty of ten shillings be paid by the master att the time of the apprentices being made free."[7]

Colonial Supervision. Not only were the colonial and town governments concerned with the term of apprenticeship and the standards of craftsmanship, but they early assumed general supervision of the entire relationship of master and apprentice. This disposition to oversee the proper development of the young citizens of the commonwealth resulted in various other laws for the protection of apprentices against "wrongs and injuries" as well as laws to protect the masters against persons "enticing away" and "harboring" their apprentices.

The principle of state control of the training of minors, together with the correlative principle of state responsibility, is implicit in these as in other colonial and town laws of the period. It was an easy step from such legislation to compulsory education laws, and it is not surprising, therefore, to find the beginnings of American compulsory education legislation in the colonial apprenticeship laws. Though at first all such legislation was designed for children of the very poor, it was soon used to force all parents to provide education for their children. In the New Plymouth and Massachusetts Bay Colonies early ordinances required the town authorities to take children and servants away from neglectful parents and masters and to apprentice them to citizens who would properly attend to their education and training. The colonies thus made of apprenticeship a genuine educational institution which was in effect compulsory for all children.

The Spirit of Colonial Apprenticeship. Throughout the colonial period much attention was given to apprenticeship by colonial legislative bodies. Not only were excellent laws passed, but they were usually well enforced. The relationship of master and apprentice in colonial America seems to have been more nearly that of the best type of medieval guild apprenticeship than was the English apprenticeship under the Statute of Artificers. Much more attention was given to instruction, and there was much less disposition to exploit apprentices as servants. The spirit of the new communities demanded more just treatment of the poor and required greater attention to the possible effects of the training of youth on the future of the new country. The statement of the master in an early Providence indenture that: "I the said Daniel Cook do promise and Ingage for myself my Executors and administrators to Learn and Instruct my said Apprentis, William Potter In the trade mistry or art of a Joiner in the best manner that I Can within the said term; and also Instruct him in the trade of a House Carpenter as I have Opportunity; *and not put him to any other servis during the sd term without his concent,*"[8] is a new note in indentures. There seems to be here expressed the purpose of adequate trade instruction and training, and this boy, at least, is promised something more than the customary long periods of servitude with more or less incidental trade instruction. The really effective colonial supervision of apprenticeship and the easy access to legal redress by the apprentice for violation of the terms of the indenture may account for such unusual emphasis on instruction. The whole scheme of colonial apprenticeship, however, appears to be upon a much higher plane than the contemporaneous English institution.

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[7] *Ibid.*, p. 26.

Masters provided "meat, drink, and lodging," and usually also clothing. The apprentice agreed to observe the usual requirements of diligence and exemplary conduct. A typical Connecticut indenture will show clearly the relationship existing between master and boy:

"This Indenture witnesseth that Jonathan Stoughton, son of Thomas Stoughton of Windsor in the county of hartford and Colony of Connecticut in new england, with his father's consent hath put him selfe an apprentice to Nathan day of the above sd windsor county and coloney; blacksmith and white smith to learn his art, trade or mystery after the manner of an Apprentice to serve him until the sd Jonathan Stoughton attaines the age of twenty-one years, during all which time the sd apprentice his master faithfully shall serve, his secrets keep, his Lawful commands gladly obaye he shall not do any damage to his sd master nor see it don by others without giving notice thereof to his sd master. he shall not waste his sd master's goods or Lend them unLawfully to aney, he shall not commit fornication nor contract matrimony within sd terme. at cards, dice or any other unlawfull game he shall not play whereby his sd master may suffer damage. he shall not absent himself day nor night from his master's service without his leave nor haunt ale houses, Taverns or playhouses butt in all things behave himselfe as a faithfull apprentice ought to do during ye sd terme, and the sd master shall do his utmost to teach and Instruct ye sd apprentice In the bove mentioned blacksmith and white smiths trade and mistery and to teach or caus the sd apprentice to be Taught the art of Arithmatick to such a degree that he may be able to keep a book well, and provide for him meat, drink, apparel, washing and lodging and phisick in sickness and health suitable for such an apprentice during the sed terme, and att the end of sd terme the sd master shall furnish the sd apprentice with two good new suits of apparel boath wooling and lining for all parts of his body suitable for such an apprentice besides the apparel he carrieth with him and for th performance of all and every the sd covenants and agreement either of the sd parties bind themselves unto the other by these presents in witness whereof they have interchangeably put their hands and seals this first day of September in the year of our Lord God, 1727."[9]

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[8] *Ibid.*, p. 63.

The relationship here defined between master and apprentice is almost identical with that found in the indentures of the best years of the old guild apprenticeship. The mutual obligations of the parties to the contract are here clearly set out, and the very essence of the institution of indentured apprenticeship is expressed. The apprentice agrees faithfully to serve his master, to keep his secrets, to obey him, to protect his goods and his interests, and to conduct himself becomingly as a member of the community. The master agrees to teach the apprentice the craft he represents and to provide instruction in what might be termed today "commercial arithmetic." He further obligates himself to provide the boy with food, clothes, lodging, and medical care. At the close of the term of service he must provide the young man with suitable clothing for one in his station in the community. Though the language of this and many other colonial indentures follows very closely the old English and Continental indentures of an earlier period, one gains the distinct impression from accounts of the times that these contracts were carried out in much better faith than were the earlier agreements. There were not confronting the young man completing his term the almost prohibitive fees and banquet expenses, which the young journeyman of the craft guilds had to meet. It is evident, too, that the numerous restrictions and distinctions of the earlier period did not characterize colonial apprenticeship. There was more of the spirit of freedom of opportunity and of justice in the execution of these early American contracts than seems to have obtained in English and European apprenticeship. Masters as well as apprentices were required to observe the terms of the colonial indentures. In these respects, then, colonial apprenticeship was quite different from the earlier institution.

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[9] *Ibid.*, pp. 58–59.

Decline of Colonial Apprenticeship. It seems clear that apprenticeship was never very popular among colonial youth, and toward the end of the colonial period it declined rapidly in importance. Regulations were relaxed with reference to the term of apprenticeship and the standards of training, and it became increasingly little more than a form of cheap labor. Among the influences bringing about a decline in effectiveness and popularity were (1) the early mills in which the trades were increasingly broken up into specialized processes that could be learned in a relatively short time, (2) the growing social prejudice against the manufacturing occupations because of their almost invariable association with poverty and pauperism, (3) the ease with which land could be obtained and one could become an independent farmer and landowner, and (4) the increasing importation of foreigners from Continental Europe who were trained in the trades. Clark wrote with reference to the prejudice against factory labor, "Manufacturing came to be associated in the eyes of the colonists with poverty; and the use of pauper labor in British factories fixed this stigma so strongly upon some industries that it outlasted the first generation of the Republic."[10] Franklin said with reference to the bringing in of young foreigners as industrial workers, "The desire among the masters to have more hands employed in working for them, induces them to pay the passage of young persons, of both sexes, who, upon their arrival, agree to serve them one, two, three, or four years, those who have already learned a trade agreeing for a shorter time, in proportion to their skill, and the consequent immediate value of their services; and those who have none agreeing for a longer term, in consideration of being taught in an art their poverty would not permit them to acquire in their own country."[11] He also pointed out with reference to the demand for young workers, " . . . Artisans are so desirous of apprentices, that many of them will even give money to the parents, to have boys from ten to fifteen years of age bound apprentices to them till the age of twenty-one."[12] The increasing urgency for obtaining skilled workers, as the population increased and both industry and business continued to expand, served to destroy the best features of the early types of colonial apprenticeship, and by the time the republic was born there was no generally practiced means of supplying the needed numbers of trained workers other than the inducing of foreign craftsmen to come to the United States from countries that maintained effective schemes of apprenticeship.

Apprenticeship after the Revolution. Throughout the entire latter history of colonial America and the whole of the nineteenth century one of the chief handicaps to industrial development was the shortage of skilled labor and the refusal of American boys to be bound out to learn trades. The Illinois Labor Bureau in a report for 1886 observed on this point: "There is both the distaste of the American Youth for the trades, and their further indisposition to identify themselves permanently with any class or with any sphere in life. The foreign workman has the traditions of many generations and the walls of caste to restrain him within limits as to his occupation; he has no possibilities beyond a given sphere, and is trained and developed within it. Thus environed, his career and ambition lie in the paths his fathers have trod, and his associations with his fellow craftsmen make the trade-union his natural and necessary place. Transported to this country, he brings his feeling for the union and his class associations with him as a habit.

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[10] Clark, *op. cit.*, p. 155.

[11] Franklin, Benjamin, *Life and Writings of Benjamin Franklin*, ed. by Albert Henry Smyth, New York, The Macmillan Company, 1906, Vol. III, p. 613.

[12] *Ibid.*, p. 612.

"But the American mechanic's boy is born to no condition in life from which he may not rise, or hope to rise, or which at least he may not abandon for better or worse. All the precepts of the schools and teachings of observation suggest other ways of making a living, or at least other avenues in life than those of his father. Add to this the time and toil required to learn a trade, and the frequent objections to his being admitted to the shops, the encroachments of machinery upon intelligent skill in all the industries, the lack of technical training in the public schools, and it is not difficult to understand why American-bred youth seek clerkships and swell the ranks of non-producers, who live by their wits rather than by manual industry, nor why four-fifths of 49,604 mechanics and artisans in Illinois are of foreign antecedents and habits."[13]

England tried to prevent the establishment of manufacturing industries in the colonies and in the new republic. The exportation of both machinery and designs of machines was prohibited. It was not possible, however, to prevent mechanics from emigrating and reproducing from memory the machinery with which they were familiar in England. Such a mechanic was Slater who opened his cotton mill at Pawtucket, R.I., in 1790. Many skilled mechanics from the British Isles and from Germany came to America after the Revolutionary War, and these men did much to start the young nation on its way as a manufacturing country. They were much sought after by American businessmen and were offered various inducements to come to the United States. Especially were ironworkers, glassmakers, and textile operatives desired.

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[13] Quoted by Bemis, Edward W., "Relation of Labor Organizations to the American Boy and to Trade Instruction," *Annals of the American Academy of Political and Social Science*, September, 1894, pp. 212–213.

Many years were to elapse before America began to feel the disturbing influences of the industrial revolution, but the first step had been made when Slater's machine-equipped manufacturing establishment began operation. This first factory was a very small affair; but it marked the beginning in America of one of the most serious problems growing out of the industrial revolution, namely, that of child labor. Its effects have been far-reaching both in their sociological and their educational aspects.

Beginning of Child Labor in Factories. The beginning of the factory system in England coincided with the period during which the laissez-faire theory of economics was dominant. The results of this dominance made possible and inevitable the exploitation of children and women by the millowners, and greatly accelerated the decline of the apprenticeship system of training workers. Since under *laissez faire* the economic welfare of a nation was thought to depend upon the absolute freedom of the individual citizen to bring about his own advancement unrestricted by government, to substitute unskilled, cheap labor for trained workers was regarded as a business virtue. To make these cheap laborers work long hours; to speed their work by means of corporal punishment; to feed them poorly and cut the time for meals to a minimum; to herd them into cheaply constructed, ill-kept sleeping quarters; and to do anything else that would reduce costs and increase profits were likewise considered business virtues conducing to the increase of national wealth and prestige. Such were the conditions which marked the early period of the industrial revolution in England. When the factory system of production started in North America, the same abuses were practiced. Clark states that "the Slater mills and their industrial descendants followed labor precedents borrowed from England. The comparatively few hands they at first required were found in their immediate neighborhood. They employed very young children. The first nine operatives engaged by Slater were seven boys and two girls, between the ages of seven and twelve years. At another early mill the force consisted of nine boys and girls and four men overseers. . . . Some mills recruited child labor from almshouses and overseers of the poor."[14] Throughout the early part of the nineteenth century the textile mills employed many children under sixteen years of age and numerous other industries used untrained boys and young men to take the places of trained men in the workshops and factories. There was little effort to curb abuses by factory owners, and labor was too unorganized and weak to offer effective protection to these miscalled "apprentices."

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[14] Clark, *op. cit.*, p. 397.

The rapid development of factory machinery and the persistent shortage of skilled mechanics throughout the nineteenth century encouraged the use of large numbers of untrained boys and young men in production. The supplanting of skilled mechanics by machines and so-called apprentices produced much bitterness on the part of labor and resulted in an unfortunate attitude on the part of labor organizations toward apprenticeship. Since many of the workers in the factories were called apprentices and paid apprentice wages, labor unions as a means of protection to their members passed numerous regulations designed to restrict the number of apprentices and to guard against the exploitation of the boys who were real apprentices and who desired to master whole trades. Even before the modern factory appeared, the excessive use of apprentices was a cause of alarm and protest by labor.

Attitude of Employers. The temptation to use women and children in every place possible in the factory was too great for the individualistic, unrestrained factory owner of the nineteenth century to resist. The social effects of such a policy and the probable difficulties ensuing with reference to the future supply of skilled workers concerned the early industrial leaders not at all. They were not the sort of men to look very far ahead. The protests of labor organizations were considered as outrageous interference with the personal liberty of American citizens; and legislatures, courts, and public opinion all were on the side of the employers. The sacred right of "freedom of contract" was invoked to shield the exploitation of women and children, who were said to be free to enter into contracts to work for whatever wages they would accept. As fast as machines were installed to do work which formerly had been done by skilled men, women and boys were employed to operate the machines. But the practice to which mechanics chiefly objected was that of employing a disproportionate number of "apprentices" in those industries requiring skilled and semiskilled workers. These boys quickly learned enough from working with skilled men to perform successfully some one or two operations of a trade and were then placed on a journeyman basis and substituted for the skilled mechanics.

End of Old Apprenticeship. By 1860 the industrial revolution had already done its work in so far as traditional craft apprenticeship was concerned and America entered the great industrial expansions of the seventies and eighties with no program of industrial education. Sporadic attempts were made from time to time to organize trade schools, but the work of these schools was insignificant as the means of solving the problem of the shortage of skilled workers. The old apprenticeship had almost wholly disappeared, and no adequate substitute was found for it. During the century voices were raised here and there demanding that some sort of school training be generally adopted to supply the nation with skilled workers and several very interesting experiments were tried and movements started. Some of these resulted in valuable institutions which have survived and in types of schoolwork which are yet prominent in public education. But the nineteenth century closed with America almost wholly dependent upon Europe for its supply of skilled labor and with no plan for a permanent solution of the problem of industrial education for American youth.

Summary and Conclusions. The American colonist brought with him the institution of apprenticeship as it existed in England under the Statute of Artificers of 1562 and the Poor Law of 1601, but he soon modified their character. Apprenticeship early became a means of common education as well as a method of training mechanics and a type of poor relief. Colonial indentures, while differing very little from earlier English models, indicate a more democratic spirit, and court records seem to show a much more equitable and thorough enforcement of their terms than appears in English practice. The overseeing of indentured children was wholly a responsibility of the colonial and town governments, and apprenticeship seems to have been an important item in the work of courts and legislatures. Out of the requirements for the education of apprentices grew the American evening school, which played an important part in colonial education. Colonial apprenticeship was clearly a form of state apprenticeship and set the pattern for modern state-supervised apprentice systems. While it was well managed by town or colonial authorities during the earlier part of colonial history, it was never popular among American youth, and its close association with the practice of compelling paupers' children to be apprenticed gradually brought it into disrepute. Beginning with Slater's little mill in Pawtucket in 1790 child labor was introduced into American industry. Gradually the substitution of boys in factory production for trained men became increasingly common and produced much controversy between labor and employers. Unfortunately for the development of a greatly needed revival of genuine apprenticeship these boy workers were miscalled "apprentices." Both employers and labor thus misused the term, and it led to an attitude toward apprenticeship on the part of labor that, to the present, has been a detriment to the growth of genuine apprenticeship. The substitution of child labor for trained workers and real apprentices was made easy for employers by the prevailing acceptance of the economic doctrine of *laissez faire,* by the weakness of labor organizations, and by the growing substitution of machines for skilled hands in the factories. One of the most serious results of the controversies over the substitution of so-called apprentices for trained journeymen was the failure of all concerned to make an intelligent and unprejudiced attack upon the problem of developing an effective and much-needed program of industrial education that would be appropriate for a country that was rapidly becoming the world's greatest industrial nation and that was essentially a democracy. The mistakes of both industry and labor during the nineteenth century with reference to apprenticeship greatly delayed an intelligent solution of the problem of industrial education in the United States.

QUESTIONS AND ASSIGNMENTS

1. How do you account for the fact that the American Colonies established a form of apprenticeship similar to that practiced under the Statute of Artificers and the Poor Law of 1601 of England?

2. Contrast early colonial apprenticeship with guild apprenticeship of the sixteenth century.
3. What were the causes of the continuous shortage of skilled mechanics throughout American colonial history?
4. What is the justification for the belief that colonial apprenticeship constitutes the origin of compulsory education in the United States?
5. What were causes of the decline and almost complete disappearance of colonial apprenticeship?
6. How do you account for the more democratic spirit of colonial apprenticeship when compared with European apprenticeship under the guilds?
7. How do you account for the general indifference of government toward the practices of industry and the controversies between labor and industry over apprenticeship during the nineteenth century?
8. To what extent is it possible under modern industrial conditions to maintain effective apprenticeship practices without state supervision? Explain your answer.

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Chapter 6

MODERN APPRENTICESHIP

Modern Adaptation of the Old Apprenticeship System. The modern relationship between employer and employee is an impersonal, institutionalized relationship, and the old system of apprenticeship, which was essentially personal in character, has to be greatly altered to be made adaptable to modern industrial conditions. Not only does traditional apprenticeship have to be adapted to a situation characterized by the impersonal nature of large institutions, but it has to be further altered to fit a scheme of production made highly complex by a division of functions unknown before the factory era. The relationship of the medieval master mechanic to the apprentice was that of employer, master workman, father, and teacher. Today the apprentice lives in his own home, he usually works for a corporation, he must be officially recognized by the mechanics of his trade, and he receives instruction from a teacher in school. This subdividing of the traditional structure of apprenticeship makes necessary a very difficult sort of training scheme. Yet industry and labor are trying to preserve the essential elements of the old apprenticeship under the new conditions. The fact that to know how to perform a mechanical operation and to be able skillfully to perform it are two very different things leads industry, labor, and industrial education to cling to apprenticeship as a necessary means of training skilled workers. It is not surprising, therefore, that much effort is being expended in the attempt to develop a new form of apprenticeship completely adapted to modern production conditions.

Modern Developments. It is possible for a worker who makes an intelligent effort to become a skillful mechanic merely by trying to imitate the work of superior mechanics, by asking questions, and by reading a little. This is a slow process of industrial education, but it has long been the one chiefly relied on in the United States for keeping industry supplied with trained mechanics. Next in importance to this source of supply has been the immigration of skilled workers from Europe. When the First World War began, the European supply became scarce and finally almost disappeared. About the same time American industry was called on suddenly to expand to huge dimensions in order to meet a world demand for war materials. Then it was that industry was forced to study the problem of industrial education with something of the degree of care usually given to engineering problems of production. Out of this situation came a genuine interest in the development of a carefully organized and efficiently supervised modern apprenticeship. Labor organizations, employer associations, and public agencies tried to solve the problem, with the result that they finally came to see, in many places at least, that the problem can be best solved only when these three elements cooperate. All three are vitally involved, and all three must work together. When the confusion of after-war adjustments had subsided, these three elements began to consider schemes of cooperative apprenticeship, and the result was a movement throughout the country of apprenticeship agreements, which, for the first time since the industrial revolution began, seemed to be appropriate to modern conditions. The Second World War gave added strength to the movement, and the problem now is to extend the movement so that greater areas of the industrial life of the country will benefit from it.

Character of the New Apprenticeship. The chief characteristic of the new apprenticeship is its recognition of (1) the necessity of cooperation among the three essential elements, namely, education, labor, and employment, and (2) the importance of intelligent supervision of all apprenticeship enterprises. Most apprentices are minors, and a democratic state cannot afford to neglect its responsibility in the matter of the education of all its minors. The life and vitality of organized labor depends, in large measure, on the maintenance of a continuous supply of intelligent, trained workers to replace the losses in its ranks from promotion, old age, and death. Employers must have a never-failing source of supply of skilled workers if the wheels of industry are to be kept turning. As has already been indicated, the three functions of the teacher, the skilled mechanic, and the employer were combined in the medieval master mechanic, and apprenticeship reached a high level of effectiveness under the guild system. The new apprenticeship, therefore, is an effort again to merge, by means of cooperative agreements, the same three factors. One other element of medieval apprenticeship, which often has been overlooked but which was essential to its effectiveness, was a thorough and authoritative supervision. Many attempts to revive the old institution of apprenticeship have failed because of the neglect of effective supervision. The guilds jealously watched over the operation of their apprenticeship agreements. Apprentices were forced to meet both the letter and the spirit of their indentures, and masters were subject to punishment for violating agreements with the apprentices and their guardians or parents. Under state apprenticeship in England, after the disappearance of guild authority the government attempted to enforce these contracts. The lack of any effective supervising agency after the rise of the factory system and the acceptance of *laissez faire* as the controlling economic philosophy was one of the chief causes of the decay of apprenticeship in England and America. The modern movement is attempting to meet this need by the creation of apprentice committees composed of representatives from labor and industry and, in some cases, from education to supervise the training program. In a few instances the state has set up machinery for the supervision of apprenticeship. With complete cooperation of industry, labor, and education, working under efficient supervision, the new apprenticeship is slowly becoming established as an essential feature of modern industrial life.

Apprenticeship and the Schools. William F. Patterson, Director of the Apprentice-training Service of the United States Department of Labor, said in 1947: "Today, as never before, it is of paramount importance to develop the skills and knowledge of those entering our industries. With changing production methods and engineering advancement, young people must have every opportunity for sound training. A large number must be trained for craftsmanship in the skilled trades. Expansion of industry since the war has brought an enormous demand for all-around skilled workers who must be developed through apprenticeship. To master the craft skills, *apprentices must be trained not only on the job but also through classroom instruction.* In the classroom they learn the theoretical aspects of the trade—technical knowledge which cannot be readily learned on the job." He urged labor and industry "to cooperate by making known to the schools the courses apprentices need, and also by working out with instructors a curriculum to be coordinated with the work training."[1] This expression by the director of the government-fostered program of modern apprenticeship is indicative of the realization of present-day leaders that the traditional functions of the guild master craftsman in medieval apprenticeship, namely, those of teacher, employer, and member of labor, must be brought together again if there is to be effective training of skilled workers through apprenticeship. Many efforts have been made to bypass one or another of the three in apprenticeship schemes, but none is fully successful that omits any of the three. The teacher is in the school, the employer is often a great corporation, and labor is a powerful labor union; but each should be represented in the training program of the apprentice.

The National Program. Much progress has been made in the development of a national program of apprenticeship since 1937. In that year the National Apprenticeship Law, generally referred to as the Fitzgerald Act, was passed "to promote the furtherance of labor standards of apprenticeship . . . , to extend the application of such standards by encouraging the inclusion thereof in contracts of apprenticeship, to bring together employers and labor for the formulation of programs of apprenticeship, to cooperate with state agencies in the formulation of standards of apprenticeship." This law resulted in the reorganization of an interdepartmental committee known as the Federal Committee on Apprenticeship that was appointed by the Secretary of Labor in 1934 as a policy group to make recommendations concerning apprenticeship. The reorganized committee was enlarged to include representatives of labor, of employers, and of the U.S. Office of Education. Also, a Bureau of Apprenticeship was established in the Department of Labor to carry out the purposes of the Federal law in harmony with the policies established by the Committee on Apprenticeship. The Bureau has been aggressive and remarkably successful. Chiefly as a result of its efforts the number of apprentices registered with the Bureau increased from about 30,000 just before the Second World War to 240,000 in 1949. It has aided state leaders in formulating model state apprentice laws and has promoted the development of standard indentures and apprentice practices. Perhaps its chief contribution has been to awaken a new interest in apprenticeship and to bring about practices that ensure high standards in apprentice training. Apprenticeship is one of the most important phases of modern industrial education, and it is imperative that the public schools fully realize the vital function of the school in any effective apprentice program and take a position of leadership in the local communities of the nation in developing cooperative apprentice programs.

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[1] Patterson, William F., "Apprentice Programs Set All-time Record," *Tech Training*, Vol. II, No. 2, December, 1947, pp. 1–2.

Factory Apprenticeship. The development and maintenance of effective apprentice programs in the factory industries present inherent difficulties that require careful consideration by industry. One of these is the cost of the programs. The cost involves at least three elements: (1) the wages paid before commensurate service is rendered by the apprentice and the loss in production from the time of skilled workers who instruct the apprentices, (2) the relatively large number who do not complete their training, and (3) the number who complete the training and obtain employment from competitors or other employers who invested nothing in their training. Industry is so greatly in need of a dependable supply of skilled workers that few companies object to the cost of instruction, provided the finished product of the program is available for service to the company that provided the training. Competing companies that made no investment in the learner can afford to bid for his services at a higher rate than that offered by the one paying the cost. Some corporations do not object to the early loss of the graduates of their apprentice programs because they regard the trained craftsman as a promoter of the industry training him. A well-known machine-tool manufacturing company expressed this attitude in these words: "Whatever promotes mechanical ability in any line, promotes the interests of the machine-building industries as a whole." For the very large, well-established corporation this is doubtless sound reasoning, but to the small and the young company trying to meet powerful competition the benefits of the investment seem so uncertain and remote that it is difficult to persuade them that the cost of a training program can be justified.

The cost to industry of the apprentice who does not complete his training is a matter of serious concern. When it is realized that cancellation rates in some cases run as high as 50 per cent, it becomes clear how difficult it is to justify the cost of an apprentice program by some industrial plants. It is probable that such high percentages of cancellation of contracts can be reduced by better organized and managed programs and by more careful selection of trainees. Where careful supervision of apprentice training is not provided and where the learning on the job is haphazard and unplanned, there is likely to develop in the apprentice much discouragement and frustration. In such a situation, there is also likely to be a degree of exploitation of the apprentice by wasting his time and energies on trivial tasks that contribute nothing to his progress. Where such conditions obtain, even to a relatively small degree, cancellations may be expected to become large in number. High morale and sustained interest can be ensured only when a learner is conscious of making progress and achieving success in his undertaking. To operate a program so that the apprentice can see that he is moving steadily toward his goal will contribute much to reduce cancellations. Of equal importance is the selection of those to be trained. It is at this point that many mistakes are made. Experience has shown that a routine procedure of filing an application, having an interview with some official of the apprentice program, and being assigned for a probationary period does not get the best results. There seem to be two important phases of a selection procedure that are essential, namely, adequate counseling and the administration of well-chosen tests. Of the two, it is probable that counseling by a trained counselor is the more important, for as Mr. Clifford P. Froehlich of the U.S. Office of Education has said, "It is recognized that many of the cancellations are not due to inability to master the training but, instead, they result from apprentices' attitudes toward the job and the inability to adjust to the training situation." He further has observed that "if counseling can do what counselors claim it can, then it is one of the best selection procedures available."[2]

Often the prospective apprentice has very little understanding of the requirements of the trade he expects to enter and even less knowledge of his own capabilities and qualifications for the work involved. The counselor can help a young person to consider the factors involved in successful work in the trade and to look far enough into the probable future to evaluate his own purposes and willingness to expend the needed time and effort to succeed. Many who enter apprenticeship are not the sort of youth who possess the habit of considering realistically the factors of success involved in their undertakings. Apprentice programs would be greatly strengthened if wise counseling were more generally available than is the case at this time.

There is sufficient evidence to indicate clearly that testing is also a very important phase of effective and desirable selection of apprentices. Mr. Froehlich, quoted above, reported the practices of an electrical union that, after providing counseling, sent its applicants to a vocational school to take a battery of tests to determine their qualifications for the trade. The selections were then made on the basis of the tests. He also told of a secretary of a plumbers' joint apprenticeship committee who reported a similar practice that resulted in cancellations of only 5 out of 125 apprentices during the year in which the procedure was followed.[3] Testing, of course, merely indicates with reasonable dependability what the applicant can do if he has the character and purposefulness needed to succeed. Tests, therefore, are most valuable only when used in connection with careful counseling. Every element of present-day conditions in industry points to the need for the use of both counseling and testing as means of selecting those who are admitted to apprenticeship in the skilled trades.

[2] Froehlich, Clifford P., "New Light Shed on Selection of Apprentices," *Tech Training*, Vol. IV, No. 2, December, 1949, p. 11.

[3] *Ibid.*

Apprenticeship Activities of Employers' Associations. Another effort to encourage the growth of a modern apprenticeship is that being made by certain national associations of employers. These associations are organized primarily for educational purposes and are very active in promoting all types of effective industrial education among the employees of the industries they represent. They are particularly active in their promotion of apprenticeship programs. The activities ordinarily engaged in are (1) publicity, (2) standardization of indentures, courses of study, and apprentice wage scales, (3) expert supervision of apprentices, (4) conducting correspondence courses, (5) initiation of cooperative apprentice training schemes, and (6) issuance of certificates and diplomas. One of the chief obstacles to the growth of apprenticeship in modern industry has been the inability, or unwillingness, of single plants to bear the expense or to assume the responsibility of a continuous program of training. The trade association effectively overcomes this difficulty. An organization supported by assessments equitably allocated among a large number of companies places no undue burden on any and makes possible a broad, well-planned, and thoroughly standardized program of training.

Such an organization not only makes possible a training program that is continuous over a long period of years, but provides a program that is national in its scope. Of course a large part of the work of an employers' association must be carried on through the local plants, but the continuous encouragement, advice, expert supervision, and publicity which such an organization provides make the work easier and more permanent in the local institution. Thus the entire industry may be assured of a continuous supply of trained young men. This movement to supply apprentice training through the united efforts of many corporations in the same industry is one of the most promising in the field of industrial education. Most of these associations have tried to employ as directors only men of sound training and long experience in industrial education, thus recognizing the fact that the administration of the successful education of apprentices cannot be left to the haphazard methods of the technical man who lacks the professional training of the teacher. This has also made possible a closer coordination of industry and the public schools in the development of the apprentice programs. School-trained directors are not so prone to ignore the opportunities offered by the public schools for supplementary training as are the shop-trained executives. A notable feature of the work of the employers' associations throughout the country is their utilization of public agencies, wherever it is possible, in the advancement of their training schemes. The type of public-school course which most effectively meets this need is the cooperative part-time course, and a large use is being made of this type of course in several industrial centers. The cooperation of the public schools with local plants, both making use of the services of a national employers' organization in the planning and supervising of courses and cooperative agreements, makes possible an apprenticeship program for small plants which otherwise could not hope to have a part in any training scheme. The success of all such arrangements, however, depends very largely on the cooperation of labor in the enterprise. So long as the employers' associations continue their efforts to enlist the interest of labor in their program, this experiment will probably continue to show encouraging results. It is, however, becoming increasingly clear that the three essential factors in apprenticeship programs, namely, the school, the employer, the labor union, must all be actively engaged in the enterprise if continued success is to be assured.

Apprenticeship in the Factory Trades. Apprenticeship in the factory trades has certain advantages over that of the custom and repair trades. The relative stability of the personnel organization in the factory makes the planning and continuous overseeing of apprentice programs fairly easy. The standardization of production processes and of products greatly facilitates planning a progression of learning experiences. It is possible to plan so that a given number of days or weeks can be spent on one process and a desirable time devoted to a succession of other processes until the whole program of training is completed. Likewise, it is not difficult to plan with reasonable accuracy for the time the apprentice is to spend in school on related technical materials required in the program. In those industries where there is a steady demand for the products manufactured, a program of training can be planned and completed without serious interruptions. In highly seasonal industries the situation is more difficult, but if close relations are maintained with the schools, it is possible for the apprentice to spend a longer time in school when his work is not needed in the plant. The greatest difficulty occurs in periods of depression and during strikes when plants are closed. Training programs usually suffer serious interruptions during depressions and when strikes occur. On the whole, however, the general situation in the factory industries is far more favorable for apprentice programs than in other industries.

Apprenticeship in Custom and Repair Trades. In the custom trades, particularly in the building trades, apprentice programs are confronted with serious difficulties. There are at least five problems that require careful study. They are (1) rapid changes in the trades, (2) the seasonal character of the industry in most sections of the country, (3) the lack of stable working conditions, (4) the reluctance of many contractors to employ apprentices, and (5) the inherent difficulty of teaching boys on a construction job.

Genuine apprenticeship has almost disappeared in the building trades. The terminology of the institution has been retained, and some of the practices still exist, but most of the essential features appear only as names. In most of the trades, to be rated as an apprentice means merely that one is within certain age limits, receives less pay than the older men, and is a helper doing odd jobs which require little or no skill. Not only has the character of apprenticeship deteriorated, but the number of apprentices has markedly decreased. The problem has become so serious that it has attracted the attention of every department of the building industry. As a result of genuine alarm, caused by the condition into which apprenticeship has fallen, a program is slowly being evolved which promises to become one of the most enlightened and effective developments in apprenticeship since the beginning of the industrial revolution. This program involves a complete cooperation of the three necessary factors in all genuine apprenticeship, namely, the school, labor, and the employer. There are many difficulties, however, in the way of the growth of such an apprenticeship in the building trades, and its development will take much time and persistent effort; but an understanding of these obstacles is necessary in order fully to appreciate the factors which must enter into the solution of the problem.

Changing Character of Trades. The rapid progress made by American builders during the last half century in the improvement of design, of construction methods, and of building materials has had a marked effect on the building trades. Not only have numerous new trades arisen, but the ancient trades have been considerably modified. Substitutes have been invented for almost all of the time-honored building materials, and in many cases they have all but completely supplanted the older materials. This process of invention and substitution is a continuous one, and a mechanic has no assurance that his trade will be in demand ten years in the future. Not only is this true, but the older trades have become so complex that few mechanics can hope to practice a whole trade any longer. Even the ancient trade of carpentry has become highly specialized in the cities, and few carpenters any longer can claim to be skilled workers in every phase of their trade. Hence, the prospective apprentice is confronted at the outset with a serious uncertainty as to the probable permanence of the trade he contemplates learning and a perplexity as to the particular phase of the trade in which he will become a specialist. Not only is this true, but the progressive standardization of practices within specialized phases of the trade is taking more and more of the handwork to the factory to be done by factory production methods, on machines. The factory has encroached on the field of the building hand trades until it is almost true now that a modern building is largely an assembly of ready-made parts. Doubtless this rapid shifting of the building trades is in the direction of progress, but obviously it places a handicap on the growth of apprenticeship in these trades.

Seasonal Character of Building Work. Even more serious, in its effect on the growth of apprenticeship, than the changing of the trades is the seasonal character of building activities. This constitutes the most unattractive feature of the building trades and is doubtless the one that is most discouraging to young men who consider entering the field. Indeed, it is one of the most difficult problems encountered by the entire construction industry. It affects material factories, wholesale companies, contractors, banks, the investment interests, and labor. Concerted efforts of several of these interests and certain government agencies are being put forth to encourage continuous building operations throughout the year. But there are inherent difficulties which make a general practice of year-round construction programs highly improbable. Only in the largest enterprises, where the time factor is very important, is it probable that any large development of this movement will occur. To the young man facing the choice of a trade, the seasonal trades have small chance to attract when placed over against a factory trade with reasonable assurance of steady employment. This is generally recognized as an obstacle in the way of meeting the serious shortage of skilled mechanics in the building trades. It undoubtedly is one of the most serious difficulties facing any program of apprenticeship. In the larger cities the important contracting firms are able to agree to furnish employment to apprentices for eight to ten months of the year, but the thousands of small operators throughout the country cannot enter into any such agreements, and they constitute the greater part of the building force of America. It is axiomatic that there can be no real apprenticeship without a job for the apprentice; hence, the importance of finding a solution of this problem in the building trades must be recognized at the outset of any successful apprenticeship enterprise.

Uncertainty of Work. Not only is building work seasonable, but it is very irregular in duration because of the characteristic working conditions in this industry. Two chief factors affecting the duration of work are the weather and the efficient movement of the construction schedule. The uncertainties of weather conditions make work most irregular even in the customary building seasons. A continued period of rain will throw thousands of men out of work in the midst of important operations and during the most favorable building season of the year. During such periods, under the haphazard methods obtaining in the building industry, apprentices are condemned to idleness and have whatever of instruction they may have been receiving seriously interfered with. But the weather may be most favorable, and yet, due to a failure to have materials delivered on scheduled time, the mechanics in a given trade, along with the apprentices, may be thrown out of work for an indefinite period. Not infrequently both the weather and the delivery of material may be satisfactory, yet the delay of some craft, which must complete its work and move on before the next group of workers begins, may keep the succeeding group idle. The large contracting firms easily control this situation, but the smaller firms frequently are unable successfully to deal with it. These periods of idleness and this irregularity of work serve to discourage the apprentice and to make very difficult the carrying on of efficient programs of apprenticeship. Much progress has been made by the more intelligent contractors in overcoming these difficulties, but the conditions described are yet too common to make apprenticeship attractive to the type of boy needed by the skilled trades.

Unwillingness to Employ Apprentices. Building contractors for many years have been strangely blind to their obligation in the matter of employing apprentices. The results of this fact are (1) a serious shortage of skilled mechanics, (2) an apparent deterioration in the quality of workmanship, and (3) the gradual disappearance of certain of the trades. It has been repeatedly stated by local investigators and by various speakers and writers who are closely related to the building industry that in not a single building trade in the United States are contractors employing as many apprentices as the union regulations allow. The often-stated comment that "the unions are wholly responsible for the shortage of apprentices" is not always true. The fault almost invariably lies in the reluctance of contractors to contribute their part in the training of needed journeymen. The building industry is highly competitive, and contractors feel compelled to eliminate every possible expense involved, and apprentices are not wanted. One contractor during a period of unusual building activity told the writer he had only one apprentice in his organization and that was his son, whom he was training to take over his business; and he expressed complete indifference to his obligation to contribute to the maintaining of a supply of trained craftsmen. The training director of a large trade association of manufacturers supplying the building industry stated in 1949 that, following the Second World War, the average age of bricklayers was fifty-seven years. This condition in most of the building trades is common knowledge and expresses clearly the serious shortage of apprentices, and it shows the inevitable result of the shortsighted policy of contractors. Many labor leaders are fully aware of the dangers of such a situation and are increasingly calling on the state directors of vocational education to aid through the work of the schools to remedy the difficulty. The schools can render much aid by means of basic trade training, but the problem cannot be solved without the cooperation of employers.

The seriousness of this problem is further emphasized by the fact that the quotas allowed by union regulations are sometimes too small to keep the trade alive. Writing in 1924, the Educational Director of the National Trade Extension Bureau of the Plumbing and Heating Industries stated that, "experience has shown that where the ratio is one apprentice to five or more journeymen, the personnel of the trade deteriorates, and losses by death and retirement or change of occupation are not made up. Where the ratio is one to four, the trade personnel stands still, and a ratio of one to three is needed to produce any considerable increase in the number of journeymen, and that only after a period of five or more years."[4] This statement is as true now as when it was written. Obviously most of the unions would soon die out were their only source of recruits the graduates of union-controlled apprenticeship, for the ratio of one apprentice to five or more journeymen is not at all uncommon in union regulations. It seems clear, therefore, that the remedy for the evident deterioration in quality of workmanship and the serious shortage of skilled labor in the building trades is an apprenticeship program that involves the complete cooperation of employers and unions, and one that insures the employment by contractors of a sufficient number of apprentices to keep the trades supplied with at least a sufficient number of recruits to keep them from disappearing.

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[4] Bowman, E. L., *Partnership between Schools and Industry in Training Building Trades Apprentices: Some Industrial Education Problems,* Monographs on Vocational Education, 1924 Series, No. 4, Chicago, The Vocational Education Association of the Middle West.

Difficulty of Training Building Apprentices. There are inherent difficulties ordinarily involved in training apprentices on construction jobs which do not obtain in factory work. Chief among these are (1) the time element, (2) the essential character of building operations, and (3) the wide variety of activities required during short periods of time. In addition to these the irregularity and uncertainty of work, already referred to, seriously affect the problem. With reference to the time element there is not only a constant pressure to rush work in order to utilize every available moment of good weather or to finish within an agreed period of time, but each craft must perform its tasks at the proper time in the progress of construction and make way for the craft which must follow. For example, in a framed house, the wiring by the electricians and the roughing-in by the plumbers must be done after the framing is completed, but before the walls or floors are covered. The lathers begin their work only after electricians and plumbers have finished and before plasterers begin. Such a program of work makes almost impossible the giving of time by skilled workers to blundering beginners, and the contractor is slow to risk the possibility of serious delays at any point by the employment of learners. Also, the character of construction work discourages the use of inexperienced labor for skilled operations. The building mechanic does not make a small part of the whole which later will be placed in the finished product, as does the factory tradesman, but his work is performed, in the first instance, on the building itself. If, in the case of the factory-trade apprentice, a mistake is made, it can be corrected before the finished product is affected. On the other hand if a plasterer's apprentice, or a tile setter's apprentice, makes a mistake, it is made on the finished product and can be corrected only by the expensive process of tearing out materials from the building. This characteristic of building work makes teaching on the job a very expensive procedure and explains, in part, the reluctance of contractors to employ any but journeymen mechanics. Finally, the range of work required in a very brief space of time makes any sort of systematic program of instruction all but impossible. Here, again, there is a marked difference between conditions in the factory and those on a building project. A machinist apprentice may spend six weeks or more on a screw-cutting machine, after which he may spend six months on a lathe, and so on, throughout his period of apprenticeship, advancing from one type of work to another as he masters the less difficult operations. In the building trades such a scheme of training is rarely possible. In one month the carpenters on a given structure may be called on, in rapid succession, to perform all the operations of their trade from rough framing to very difficult inside trim work. The carpenter's apprentices would, in such a case, have little chance to acquire skill in any one phase of the trade before that step had been completed and the next phase begun. Of course contractors carrying on several projects at the same time can shift their apprentices from job to job, thus prolonging the period of training in any given phase of a trade, but this involves a frequent change of instructors for the learner which does not make for efficient training. These and other difficulties inherent in the building industry constitute very real problems in apprenticeship, and it is questionable whether an effective program of training for the building trades is possible without the cooperation of school shops, where these difficulties do not exist.

Cooperation as a Solution of the Problem. The need of cooperation in the building trades appears even more necessary than in the factory trades because of the inability of the building contractor to provide stable conditions of work. The greater strength of the building-trades organizations also suggests cooperative efforts in the matter of training apprentices; hence, the cooperative projects being launched in the building industry seem particularly appropriate in that field. By creating apprenticeship committees composed of representatives of industry, labor, and the public schools and by defining the specific responsibilities of each of the parties to the agreement, most of the usual difficulties encountered in apprentice training can be obviated. In such a cooperative enterprise employers agree to provide employment for the apprentices, with stipulated rates of pay and for a definite minimum number of months in the year during the term of indenture. Labor agrees to furnish the apprentices, be responsible for their attendance, diligence, and good behavior. The schools agree to furnish the needed training that cannot properly be given on the job. Thus the three necessary factors in all real apprenticeship training are present, and each is assigned its appropriate responsibility in the program. The committee as a whole makes the regulations governing the apprenticeship, draws up the indentures, plans the courses of study and of work, both for the school and for the job, provides and grants certificates of graduation, and supervises the entire program. Under such a scheme it is possible for the apprentice to be indentured to the coooperative committee rather than to the employer or to the union. Such a scheme has many desirable features, but it is feasible only where there are genuine interest and enthusiasm for apprenticeship and real, wholehearted cooperation among the three elements represented. This plan is much more in harmony with American ideals of democracy than that of placing the burden of training upon any one of the three agencies, and it ought to be easily carried out in any American community. Under such a plan the employer is relieved of any suspicion of exploitation, labor has a legitimate measure of control of the numbers entering its ranks as well as of the qualifications of the entrants, and the school is able to perform for the young people entering the trades the work it is fitted to do and should do as the educational agent of society. The apprenticeship committee is the nearest approach thus far made to a complete reproduction of the medieval master mechanic in his relation to apprenticeship, yet it is essentially modern in its characteristics and is fully in keeping with the requirements of modern production methods. This plan, or some other much like it, seems to be the only way in which the problem of training apprentices in the building trades can be effectively met, and there is much in it which might be adapted to the factory-trades program.

Progress of Cooperative Plans. There are in operation throughout the country a few local plans which approximate closely the scheme outlined in the preceding paragraph, and there is evident a tendency to develop state programs of apprenticeship on such a basis of cooperation. A number of informal agreements among the three elements of this scheme are in successful operation, and the very great enthusiasm exhibited by every one concerned is strong evidence of its feasibility. An interesting outcome of the plan is the fine spirit of cooperation engendered by a successful joint enterprise. This spirit will doubtless carry over to other relationships among the three elements to the benefit of all parties. The possibilities in the opportunity afforded the school to render a genuine educational service to the thousands of boys and girls who otherwise would be lost to its influence are immeasurable. The support given the schools where such a scheme is in operation also points to the advantage of active cooperation of education with labor and the industries. Some of the most difficult problems of administration in industrial education are easily and efficiently solved by such cooperation. The problem of the excessive cost of materials is immediately solved, for employers gladly furnish the materials used in modern industry. Several years ago at a large public vocational school operated on this basis, the writer found that employers delivered, free of all cost, large quantities of the finest materials, and in some of the shops expensive equipment was supplied by the employers. In a department training steam fitters and mechanics for the heating trades, there was found complete equipment of every known, modern type of heating. Several of the units in this department would have cost the school thousands of dollars, yet the entire equipment was furnished free of all costs. In the baking department many of the supplies were furnished entirely free of costs. In the paper-hanging department not only were all the supplies furnished in abundance, free of cost, by the employers, but the union sent an official, daily throughout the year, to check on the attendance and to assist in the instruction. In matters of school discipline there was perfect cooperation among the three. Under this arrangement there is no difficulty in securing apprentices. The advantages offered to the boys are so obvious and the training is so complete and thorough that they do not hesitate to enter into long-term agreements. The labor unions are more and more frequently taking the initiative in starting such cooperative enterprises. It should be the task of the school, however, as the chief permanent educational agency in the community, to initiate and maintain the movement and to become the continuous sustaining factor in any cooperative project extending over a period of years.

Need of State Supervision. As the cooperative plan of apprenticeship develops throughout the states, the need for state supervision will become increasingly important. This is due to the need for permanency in supervision and policy in any apprenticeship training and to the need for uniformity in standards and procedures throughout a given trade. Mechanics, particularly in the building trades, have to move frequently from place to place, and it is important that the same standards of skill and training be maintained everywhere, at least within the same state. It is also true that policies and practices in any local situation are much more likely to change within short periods of time than in a larger political unit. Since the very essence of successful apprenticeship is permanence of policy and procedure, the state should exercise a general supervision over all apprentice contracts and training programs. The precedent for such supervision is well established in the case of the professions. Teachers, doctors, lawyers, and other professional men have for many years been licensed by the state, and no new principle is put forth in extending state supervision to the training and licensing of skilled mechanics. There are indications that this state overseeing will itself take the form of a cooperative enterprise, since the tendency seems to be for the state apprenticeship commissions to be formed of representatives of the employers, of labor, and of the schools. A rapid development of this new function of state government will probably be one of the important results of the new apprenticeship movement in the United States.

Repair Trades. In the repair trades the problem of maintaining an effective apprenticeship program involves few of the difficulties of the building trades. It is in most respects similar to that of the factory trade but possesses the advantage of a closer personal relationship between the employer and the apprentice because most repair businesses are small organizations.

The nature of the work makes possible the providing of opportunities early in the apprentice term for practice on typical jobs under close supervision of a skilled mechanic. Because of the increasing need for technical knowledge by the repair mechanic it is important that the apprentice have opportunity for supplementary school training in the technical phases of his work. Since repair working conditions are usually highly stable, cooperative part-time or evening-school programs are easily maintained. There is a growing need for a much greater technical training of repair mechanics than mere shop experience can provide, and some sort of cooperative arrangement with the schools is clearly indicated. In many cases apprentices enter the repair trades after completing trade courses in the vocational-industrial departments of the high school. This arrangement is probably the most desirable one for the training of repair mechanics. Because of the growing number of complicated mechanical products being purchased by the general public there is an ever-growing demand for well-trained repair mechanics. The need, among the more important repair trades, is mainly for auto mechanics, airplane mechanics, telephone repairmen, household electric-equipment repairmen, and refrigerator repairmen. The technical knowledge needed by such mechanics, of course, varies with the type of work performed, but while the amount of knowledge is not great, it is of such character that most of it can best be taught under school instruction. Hence, the need for a close relationship between the schools and apprenticeship programs for repairmen seems evident.

Summary and Conclusions. Essentially, the basic problem of developing an effective modern apprenticeship is that of creating, under modern production conditions, as close approximation as possible of the best type of medieval craft apprenticeship. The essence of the best type of craft apprenticeship was the threefold function of the master craftsman. He was at once employer, representative of labor, and teacher. These functions have been separated and for the most part sharply segregated since the rise of modern industry. The problem, therefore, is to bring together again in an effective unity these three functions.

The most feasible plan seems to be the establishment of apprenticeship committees that are representative of employers, labor, and the public schools. Such a plan approximates under modern conditions the characteristic feature of what is sometimes referred to as the "golden age of apprenticeship." With such a plan in operation each element of the enterprise can make its appropriate contribution to the proper training of the apprentice.

Apprenticeship varies in its practices and effectiveness in the three major types of trades, namely, the factory, the building, and the repair trades. Conditions in the factory and repair trades are generally more stable and, therefore, more favorable for successful apprenticeship programs than they are in the building trades. The most difficult problems are found in building-trades programs because of the seasonal character of the work, the variety and rapid changing of operations, and the reluctance of contractors to employ apprentices. In all cases the school can and should play an important role in the training of apprentices. In all cases, too, it is increasingly clear that state supervision of apprentice practices is highly desirable. The interest in apprenticeship is rapidly growing, and its importance to modern industry is becoming increasingly evident. Apprenticeship is essentially, and always, an educational problem; and in a democracy it should be of much concern not only to educators but to the general public.

QUESTIONS AND ASSIGNMENTS

1. How do you account for the fact that apprenticeship has for many years been dealt with chiefly as an economic matter rather than as an educational problem?
2. Define apprenticeship carefully, and then explain why it is essential that employers, labor, and the schools should be brought together in a unified plan of providing apprentice training.
3. Describe the organization and operation of the Federal Bureau of Apprenticeship.
4. In what department of the state and Federal governments would apprenticeship be dealt with most appropriately in your opinion? Give your reasons.

5. Describe with illustrations the difficulties encountered in maintaining effective apprenticeship programs in the building trades.
6. Give the reasons you would present both for and against close supervision of apprenticeship programs by state authorities.
7. How do you account for the growing interest in apprenticeship by employers, labor, and government?

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Chapter 7

MODERN TRAINING PROBLEMS

Certain Effects of the Industrial Revolution. The industrial revolution has proved to be one of the most significant changes in human history. Not only was the old type of apprenticeship almost completely destroyed, but also the whole scheme of social and economic organization was vitally affected. Towns became great industrial cities, methods of organizing and conducting commerce were changed, the distribution of occupational groups was rearranged, ideas of government were fundamentally altered, and almost the whole range of human activities was reorganized. To trace the ramifications of the industrial revolution would require the writing of the history of civilization since the beginning of the nineteenth century. But the immediate and direct effects of this remarkable change of direction in the stream of human history are to be found in the new methods of production and the new types of work demanded of industrial workers. The leisurely craftsmanship methods of the Middle Ages and the early modern period almost completely disappeared. The purely local character of industry changed to that of quantity production for national and world markets. The independent journeyman mechanic, owning his tools and controlling his conditions of labor, changed to a factory operative or to a mechanic wholly dependent upon capital both for the tools with which to work and the opportunity to work. These changes, and many others, came directly from quantity production and its corollary, the specialization of processes.

Specialization of Processes. With the coming of the factory the minute division of production processes was permanently established as a characteristic feature of the new period of industrial history. This division of labor has been a continuous process of breaking up production into smaller and smaller units of work. Since most factory processes are performed on machinery, it has meant the constant invention of new types of machines. The new specialized machines have tended more and more to become automatic in their operation, thus requiring less and less of the old type of skill on the part of the operator. The tendency has, therefore, been in the direction of decreasing the need for all-round skilled mechanics in the immediate processes of production. The amount of specialization of industry necessarily varies with the character of the product. Some industries are so finely divided into minute machine processes that handwork and highly skilled treatment are almost entirely eliminated and the semiautomatic machine is used throughout. Other products require skillful handwork at almost every point of production. Between these two extremes the relative amounts of specialization and automatic machine work vary greatly. It is noteworthy that the plants which develop the highly specialized, semiautomatic machines for the automatized industries are manned almost exclusively by highly skilled all-round machinists. In such plants two machines exactly alike are rarely built, and much skilled work is required in the manufacture of newly designed parts and in the very complicated processes of assembly. It is in the standardized processes that the high degree of specialization is possible. Standardization in production is a chief contribution to industry of the machine era. It has reduced costs of products to the consumer and has brought in scientific factory management involving cost accounting, time-and-motion study, and trained personnel workers.

Semiskilled and Unskilled Workers. One of the important results of standardization and specialization is the bringing into the factory industries of many thousands of workers who are of the economic group that has from time immemorial been designated "the hewers of wood and drawers of water." These workers may now earn relatively high wages while working under conditions that are immeasurably better than any known to them since the beginning of organized society. Not only is this true, but such laborers can, by means of the marvelous machines they operate, produce more goods and do it more rapidly than could the most highly skilled mechanics in any previous age of history.

The fact that the number of such workers is very large in industry creates an important problem of industrial training, for these workers need training to perform their work efficiently, however narrow the range of skills required of them. In the popular mind these workers constitute the typical industrial labor group because they are numerically the dominant group. Some important educational leaders have been misled in their thinking about industrial education by the numerical predominance of the semiskilled and unskilled workers in the large factories. It should not be overlooked, however, that the vast majority of manufacturing plants employ fewer than 100 employees and that over a long period of industrial history less than 1 per cent of the plants has employed 1,000 or more wageworkers. It is also important to consider the fact that the very great growth of industry during recent decades has by no means caused a decrease in the number or percentage of skilled mechanics. It is chiefly in the large plants engaged in mass production that the semiskilled and unskilled find their greatest employment. In their book *Education for an Industrial Age,* Kahler and Hamburger remarked on this point: "The big workshops of the nation produce a considerable portion of the newly manufactured products, but in aggregate employment they cannot compete with the many smaller plants and with the many repair and service industries." And they failed to include in their statement the large numbers engaged in the building and other custom trades and industries. With reference to the character of the semiskilled and unskilled industrial workers, it is noteworthy that as a group they are handicapped by lack of education, ambition, and pride in their vocation. There are, of course, many individual exceptions, and a few are able to lift themselves to the ranks of skilled mechanics and even to supervisory positions; but, in the main, they shift readily from factory to factory, often from industry to industry and from one section of the country to another. Their mobility and job versatility are among their most striking characteristics. This condition is a direct outcome of standardization of process and the use in mass production of semiautomatic machines. Increasing wages and shorter work days and weeks are rapidly placing these workers in such a position that they present an important social and political problem. By means of better enforced compulsory education laws, better schools, and the extension of part-time school programs much can be done by the schools to solve this problem. Their general education and occupational training both before and after entrance on wage earning constitute an educational challenge that the public schools will have to meet in the years ahead.

Kinds of Work Performed by Operatives. The type of work performed by machine operatives and other low-skilled factory workers is implied in much that has gone before. The skilled mechanic not only must have a wide range of well-drilled muscular coordinations, but he must possess considerable technical knowledge and be able readily to adjust himself to novel mechanical situations. He must, in short, be master of a whole trade, or large division of a trade. The semiskilled and the unskilled workers, on the other hand, need only to be able to perform a few simple operations rapidly and efficiently and to be able to meet appropriately a very few relatively simple situations. They must be able, for example, to start and stop a machine, know when the machine is not functioning properly, and perhaps feed material into, or take finished work from it. In some processes the semiskilled worker has a somewhat wider range of duties. The unskilled worker may merely fill containers with manufactured products, he may stick labels on boxes, or merely stand and pull a lever at regular intervals. No great amount of judgment is required, and no technical knowledge is needed for such work. Neither is any large amount of ingenuity or initiative required to meet the demands of his part of production. He merely does a necessary part of a standardized, specialized process wherein his every move has been anticipated by someone "higher up" who has made complete provision for all phases of the process requiring the exercise of forethought and the choice of action. His work is therefore repetitive, largely mechanical, and makes little demand on his ability to think. But it is wrong to conclude that no skill is involved in such work. Skill of a sort is used—astonishing skill, at times—but the skill exercised is limited in its range and is therefore quickly developed. Neither is it safe to assert that the effects of such work are necessarily harmful to intellectual life and moral character, for many find happiness only in this type of activity. The semiskilled and unskilled tasks in industry, however, do not necessitate long preparation nor large general ability. They require powers of endurance, manual dexterity, and the willingness to work continuously at tasks which do not challenge thought, stimulate interest, or require the exercise of any great amount of judgment.

Training Needed by Low-grade Workers. The importance of giving special training to those who work at the semiskilled and the unskilled operations has been realized only recently by industry. The necessity of rapidly training large numbers of men for specialized tasks during two world wars made clear the value of well-planned training schemes for this type of labor. The fact that the training needed may be given in a very short time in no wise detracts from the importance of giving it. Much of the dissatisfaction of such workers is due to discouragement resulting from repeated mistakes during the breaking-in period. Many of these mistakes might be avoided by giving an intensive training for a brief period preceding production work. The training needs of these workers are relatively simple in character, consisting chiefly of instruction in factory hygiene, factory routine, factory regulations, safety first, and training in the operations they are to perform. These are the minimum requirements. There are other training factors which are important, but the results of giving even this small amount of "vestibule," or entrance, preparation amply justify the cost. It is evident that the responsibility for such training rests chiefly with industry itself.

There is, however, a very important part for public education to play in the industrial training of such workers. This part has to do with general training both with respect to various necessary skills and to the acquisition of facts, attitudes, and habits, both physical and mental. By a reorganization of teaching material and method in the upper grades on a basis of actual needs of factory workers the schools can easily make an important contribution to the success of these workers. Many of the accidents in industrial plants are due to ignorance. Inability to comprehend printed instructions and posted warnings and lack of knowledge of the simplest laws of health and safety are chief causes of serious injury and fatality among low-skilled workers. It is doubtless true, also, that they would feel a much greater interest in their work if in the school period they were familiarized with machinery and tools and taught something of the meaning of machine production and of modern industry. Discontent and restlessness, usual characteristics of the semiskilled and unskilled, are chiefly due to ignorance—ignorance of the significance of the work they perform and of the related activities of others. The development of good citizenship as it relates to government, to community life, and to the workers' relation to employer and fellow-workers, is a large factor in the proper training of such laborers. Here, again, industry cannot adequately supply the need and should not be expected to do so. Such types of training properly belong to the public school, where the point of view of the general welfare prevails. Hence, there are two important phases of the problem of the training of the semiskilled and the unskilled, namely, industry's part and the public school's part.

The Skilled Worker. The skilled worker constitutes a very different phase of the problem of industrial education. He is always an adult who is a master of his trade. Under modern factory conditions the skilled mechanic must not only possess a very high degree of skill but he must have a technical knowledge far in advance of that possessed by the best mechanics before the factory era. As machinery more and more takes the place, in mass production, of human hands, the skilled worker of the factory tends increasingly to be a machinist. His work is the assembling, adjusting, and repairing of machines. It is usually true that the more nearly automatic a machine is, the more complex it is in its structure. As production becomes more nearly automatized, therefore, the more expert does the machinist, who adjusts and repairs machines, have to be. He must know mechanical principles in order that he may be able quickly and accurately to discover where the trouble is in a machine which has broken down and is delaying production. He belongs less and less to the production force of the factory and more and more to the service group. The extent to which this is the case varies, of course, with the character of different industries. In a few industries, as, for example, publishing, a very large proportion of the production workers are highly skilled, but the general trend is toward the concentration of skill in the engineering and service staffs. The installation, upkeep, and handling of motive power; the installation and upkeep of electrical equipment, steam lines, and water lines; the repair and maintenance of machinery and other production equipment, are all assigned to skilled hands. The production of marketable goods is chiefly the work of semiskilled and unskilled hands. Such is generally the case in the great industrial plants. In the building, repair, service, and custom trades the skilled worker still plays the chief part in production, though even here specialization is gradually bringing about a condition somewhat similar to that in the mass production industries.

The Training of the Skilled Worker. Notwithstanding that the need for better means of training skilled workers has been realized by leaders in both industry and education for many years, much remains to be done to provide for their vocational education. Day trade classes in public high schools and trade schools, evening schools, private trade schools, and public part-time schools are all contributing something toward the supplying of the nation with skilled mechanics. Of these last, one of the most promising, and the one that meets most nearly the conditions which must be met, is the public part-time school. It combines effectively work for money and training under competent instruction. This type of work has been greatly stimulated by the operation of the Federal Vocational Education Act. Under the operation of this law it has been possible to give excellent training to large numbers of beginners in the trades who otherwise would have been left to "pick up" their trades as best they could. With all the efforts of all the various agencies interested in this problem, however, a relatively small proportion of the skilled mechanics of the country have been adequately and efficiently trained. The vast majority still, as in the early days of the machine era, pick up or "steal" their trades. A young machinist described the process by which he stole his trade in this fashion: "I went to a factory and asked for a job. I told the boss I was a machinist and he put me to work. It took him two days to find out I didn't know anything about a machine, but I learned something about my machine in the two days. After he fired me I got another job and this time I lasted a week. When I was fired from this job I got another and held it for a month before they put me on some work I couldn't do. It wasn't long before I could hold a steady job and I finally became a good machinist." Needless to say, this occurred during a time of business expansion, and this boy was an unusually capable fellow. But this story, with variations to suit the particular trade involved, is the training history of many American mechanics.

Another method of picking up a trade is the usual "helper" method. This commonly goes under the name of "apprenticeship." It is a sad counterfeit of a genuine apprenticeship, but it is the meaning of that word as used by many mechanics. A boy is hired as a helper for a skilled workman and is gradually given more and more opportunity to perform difficult processes. After three or four years he is paid journeyman's wages and is accounted a skilled mechanic. Where labor unions carefully supervise this practice, it approaches very nearly a genuine apprenticeship and often produces a very satisfactory type of workman. One other method of training skilled workers is that of the corporation, or plant, school. Many of the larger industrial plants maintain excellent schools for apprentices. The boys are indentured to the corporation for a definite period of years, and the company agrees to teach them a trade, paying them stipulated wages during the training period. This is a very effective means of training but is necessarily limited in its scope and is, in the nature of the case, confined to the very large plants.

Much progress has been made toward the development of effective apprenticeship programs throughout the nation since 1937. In that year the Congress authorized "the Secretary of Labor to set up standards for the employing and training of apprentices; to bring management and labor together to work out plans for the training of apprentices; to appoint such national committees as needed; and to promote general acceptance of the standards and procedures agreed upon."[1] As a result of this act the Federal Committee on Apprenticeship was appointed to develop standards and policies, and the Apprentice-training System was established. This System operates chiefly through state apprenticeship councils and local apprenticeship committees. The state councils are set up by state departments of labor and are composed of representatives of employers, of employees, of the state labor department, and usually also of the state board for vocational education. "Using the apprenticeship standards recommended by the Federal Committee on Apprenticeship, the State Councils set up their own standards and procedures which industry will be asked to follow in employing and training apprentices."[2] The activities of the Federal Apprentice-training Service have resulted in a greatly increased interest of the public, labor, and employers in the development of an organized, effective apprenticeship that is appropriate for modern industry. Wherever full cooperation among all the groups and agencies concerned exists, excellent results are obtained. It is particularly important, where strong vocational-education departments are found, that those departments have a leading part in the local apprentice-training programs.

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[1] U.S. Department of Labor, Apprentice-training Service, *The National Apprenticeship Program*, Washington, D.C., 1947, p. 1.

Thus it is that America has attempted to solve a problem which can adequately be solved only by means of carefully formulated plans carried out by the full cooperation of all the interested factors, namely, the workers, industry, and the public. It is remarkable, not that the nation has fallen so far short in its efforts, but that so many youth manage to become skilled workers.

Changing Trades. Because of the constantly changing status of industrial occupations and the seasonal character of many industries it is often necessary for workers to be able to shift from one operation to another within a plant, or to change from one industry to another. Under the old craftsmanship scheme of production this sort of versatility was next to impossible and rarely necessary. Guild regulations would have prohibited such changing of occupation if conditions had warranted it. Today workers may suddenly be faced with a shutdown of the plant or a cutting down of the force. For the semiskilled and the unskilled such a situation is not necessarily serious so long as there is a demand for labor in some other industry. They can easily be trained for the new duties by a relatively simple plant training scheme. In the case of the changing of the skilled worker, however, it is necessary to provide some means for a more or less prolonged preparation for the new trade. Since there seems to be a very large degree of transfer of training occurring in passing from one skilled occupation to another in industry, the training for the new work can be given in a relatively brief period when the new trade is related to or similar to the one in which the worker is skilled. Intensive short-unit courses appear to be the most effective means of solving this phase of the problem of industrial education. These courses can be given in public high schools, part-time schools, or other public schools adequately provided with equipment and teaching personnel.

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[2] *Ibid.*, p. 2.

Upgrading. The upgrading of workers also presents a training problem. There are two phases to this problem, namely, the improvement of their present work and preparation for advancement. In the case of the skilled mechanic, upgrading is provided for chiefly by a broad and thorough preparatory training before beginning his lifework. Where the preparatory training has not been adequate, supplementary study by means of correspondence courses, evening-school classes, or short-unit, part-time courses will meet the need. For the semiskilled and the unskilled, evening classes or full-time, short-unit courses seem to be the solution. The better plant training programs provide for upgrading through plant schools, but most workers have to shift for themselves in securing additional training to prepare for their vocational advancement.

Foremanship Training. Industry during recent years has come to realize more than ever before the importance of having well-trained foremen. The foreman, not infrequently, is regarded as a man driver—one whose chief duty is to see to it that those under his authority do the maximum amount of work in the minimum time. But it is increasingly the case that the real significance of foremanship is being recognized. There seems to be a direct relation between the amount of labor turnover and the quality of foremanship in an organization. The training and trade knowledge of the foreman affect materially the quality of product coming from any given department. Both these factors in production seem to involve the ability of the foreman to manage and to train those he directs. The fact, referred to in an earlier section, that most workers in industry pick up their occupational skill and knowledge suggests the importance of the foreman as a teacher or trainer of workers. That many foremen do not regard this as an important part of their duties is obvious, but an increasing number are trying to equip themselves better to perform this task. The foreman is frequently referred to as the key man in an industrial organization. He stands between the management and the workers. Every important move initiated by the management affecting production processes or personnel must, before it becomes effective, pass through the foreman's hands. Mr. Charles R. Allen, writing of the part the foreman plays in the development of American manufacturing, said: "We must perfect processes, but it must be the foreman who sees that they are correctly carried out; we must have first-class men on the job, but it is the foreman who must see that the conditions are such that these men can do a first-class job. We must invent new types of equipment, but the foreman is the man who must see that it is operated effectively and not abused. We must cut down turnover and save the cost of continually changing our force, and the foreman can do more than any other one man to bring this about. For all these reasons and for many others the American foreman in the American plant can do as much, if not more than anybody else to enable our industries to make good under the new conditions."[3] It seems then that a foreman's job is of such a nature that training is very important. Only experienced workers of maturity are chosen for such work; hence, any training given must be given on the job or at such times as will not interfere with the full-time work of a mature man. Foremanship classes that meet in the factory after working hours seem to meet the needs. Such classes, when skillfully conducted by well-trained leaders, result in a much higher type of foremanship than is found where no training is provided. In foreman training classes the prospective foremen are led to see all the factors which their work involves and to see that they exercise a teaching as well as a production function. They learn how to study their problems in an orderly, effective manner. To be able to see the factors which are involved in the successful handling of workers and to be able to see himself in proper relation to these factors are the needed abilities of a successful foreman. An effective technique for the conducting of foremanship classes has been developed, and the chief problem now faced is that of persuading more employers and foremen of the value of such training courses.

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[3] Allen, Charles R., *The Foreman and His Job*, Philadelphia, J. P. Lippincott Company, 1922, pp. 8–9.

Building, Service, and Custom Trades. Outside the factory walls there is another great group of industrial workers. These are the carpenters, bricklayers, stonemasons, plumbers, plasterers, electricians, structural-steel workers, automobile repairmen, radio repairmen, and many other such groups of skilled mechanics. In addition is the great host of helpers and unskilled laborers attached to the industries of building, repair work, and transportation. What are their training needs? The training problems of these groups are in the main identical with the corresponding grades of workers within the industrial plant. In the case of the building trades, however, there are certain important differences which have to do chiefly with the administration of the training programs. The skilled mechanic in the factory may under normal conditions be assured of a fairly continuous employment in one place. In the large plant, as indicated earlier in the chapter, it is possible to establish apprenticeship schools and to secure indentured apprentices who expect to spend three or four years in continuous work and study in the plant. In the building trades, on the other hand, work is seasonal and uncertain, continuous employment by the same employer being rare. A bricklayer or plasterer may, and often does, work for four or five different contractors within a season. There is small chance for anything corresponding to a plant school under such conditions, and apprenticeship agreements are difficult of fulfillment and enforcement. Much of the construction work in America is carried on by small contractors who find it next to impossible to maintain permanent organizations, and such employers are reluctant to enter into apprenticeship contracts or to make any kind of provision for training employees. The training of boys and young men in full-time trade classes in the schools is entirely feasible, and excellent results are being thus obtained. But the boys who enter these occupations usually do not think that they can afford to spend the necessary time for preparation, and the number of boys in attendance at full-time trade schools is too small to be significant as a factor in the problem. It is probable that this number will increase as the secondary-school population continues to grow, but, for the present at least, the part-time class seems the most practicable. The unskilled worker in the building fields doubtless can best be trained on the job. His work is so simple and requires so little skill, dexterity, and knowledge that the mere following of directions will, within a very short time, give him the necessary training. It is, therefore, chiefly a matter of providing competent foremen.

The repair mechanic outside the factory is usually a small proprietor or the employee of such an employer. His training can be had by an informal apprenticeship under relatively favorable conditions approximating the old system of the guild craftsman. But here again it is probable that short-unit, part-time classes in the schools supplementing his job experiences will most satisfactorily meet the need.

The Vocational-technical Worker. A different problem from those thus far sketched is that of the training of the "vocational-technical" workers of industry. There is a considerable body of workers in modern industry who occupy a position between the wageworker on the one side and the engineer on the other. The foreman is sometimes placed in this group, but since he requires a somewhat different sort of training from all the others and since he has a different origin, being almost invariably a promoted mechanic, he will be omitted from the problem as treated here. Modern industry has within its ranks a large number of draftsmen, inspectors, salesmen, estimators, installation specialists, demonstrators, minor executives, and other specialists, all of whom must have a good general education and a considerable amount of technical knowledge. These technical workers sometimes come up from the ranks and prepare themselves for such promotions by means of evening schools or correspondence study, but a large number enter industry directly from the technical high schools and the lower classes of the engineering colleges, and increasingly they are being prepared in "technical institutes" and technical curriculums in other types of schools. Their work requires familiarity with production processes, a knowledge of technical principles underlying these processes, and a general education of about the character and extent of that of the high-school graduate or preferably that of the junior-college graduate. Such employees must be able to read drawings readily and to deal intelligently with the many problems which continually arise in industry that require a sound technical training. The special training of these important workers has long been one of the most neglected phases of industrial education, but the ever-increasing technical character of industrial production and maintenance makes it one of the most urgent modern problems of industrial education.

The Higher Technical Worker. There remains to be mentioned in this survey of training problems the training of the "commissioned officer," or the engineer, and the high-level executive. At an earlier period all such men rose from the ranks, but an increasing proportion of them now enter industry as engineering graduates from colleges and universities. Their work is managerial and creative. They must be more than intelligent executors of other men's orders; they must be able to plan, design, organize, experiment, and direct. Their training must be thorough in the scientific principles underlying modern engineering practice as well as in the applications of those principles. More than this, they must be men of such caliber that they can initiate, plan, and direct important industrial projects. The scientific knowledge required and the high type of technical training necessary in modern industry make the preparation of the engineer essentially a college matter. Many successful engineers have worked up from the lower technical ranks without formal college training, but the universal demand now is for the graduate of the engineering college, and increasingly men are in demand who have had college training beyond that required for the bachelor's degree.

Summary and Conclusions. Specialization and standardization of processes in modern production have caused a marked change in the distribution of skill and technical knowledge in industry.

The greater number of industrial workers in factories are machine tenders, machine operators, and unskilled workers of various kinds. The skilled workers constitute a relatively small part of the total number of factory employees, though the actual number of such workers in industry is large and continues to increase. Above the skilled worker are the vocational-technical workers and foremen. Still higher is the engineer and the executive who must possess expert knowledge and a high type of ability. All these groups need training, but the training of each group differs from that of any other. Provision must also be made for the upgrading of workers within each group. With the possible exception of the unskilled worker on construction operations the training needed by industrial workers involves two factors: (1) definite, organized instruction and (2) actual participation in the occupation. For those at the lower levels part-time instruction alternating with occupational participation seems to be the most desirable scheme. For the higher grade groups a thorough preparatory training in school followed by a period of apprenticeship in industry seems to be the most effective procedure.

It is most important to distinguish between the problems of the factory trades and those of the repair and custom trades. The conditions of work vary greatly among the several groups, and the maintenance of training programs requires careful consideration of the special working conditions involved in the respective groups. In all cases one of the most important training needs is that of adequately preparing foremen for their personnel and teaching functions.

None of the training schemes thus far developed is fully satisfactory, and all need to be carefully studied and frequently reevaluated as means of meeting the industrial-education needs of the nation.

QUESTIONS AND ASSIGNMENTS

1. From the latest United States occupational census reports make a table listing the numbers of factories of different sizes and the percentages of the different-size groups.
2. From the latest United States census reports make a table showing the numbers of skilled and semiskilled mechanics employed in four major industries.

3. What has been the trend in the growth of the several different types of industrial classes or schools in the national scheme of industrial education?
4. Prepare a brief report on the present status and trend of vocational-technical education in the United States.
5. What is the effect of widespread unemployment upon the growth of each of the several types of industrial-education schools or classes?
6. In view of present economic conditions and probable conditions in the immediate future, what do you believe will be the future of the full-time day trade school? Explain your answer.
7. What are the features of modern industry that suggest the probable growing importance of the schools in industrial education?

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Chapter 8

THE ROLE OF SKILL IN INDUSTRIAL EDUCATION

One of the most controversial subjects affecting the program of industrial education is that involving the meaning and character of skill and its significance in modern industry. The use by industry of large numbers of machine "operatives" and other semiskilled workers has misled many educators and other observers with reference to the role of skill in industrial education. A professor of secondary education in a well-known college of education distributed to his students mimeographed material stating: "Percentage of jobs requiring little or no preliminary training of a specific type has been variously estimated from 15 to 95 per cent. *Important in considering vocational education in high schools.*" The same paper further said: "American Youth Commission studies indicate that 'not more than 5 per cent of all workers in industry require skilled training and that approximately 95 per cent of these are now trained on the job under supervision of a foreman . . . . A recent survey in one of our centers of eleven hundred occupations requiring no experience showed that 77 per cent required no formal education and less than 1 per cent required trade school education . . .' These facts mean that for a vast majority of youth, the high school need not be concerned primarily with specific vocational training in a strict sense . . ." Since 77 per cent require no formal education, it would seem that the same figures so interpreted might be used to argue against being primarily concerned with general education for the majority of students. President Hutchins of the University of Chicago was quoted in 1944 as saying, "The thing to do with vocational education is to forget it. As the war training programs in industry have shown, industry can train its hands if it has to, and it can do it at lightning speed."[1] These and similar expressions by those unfamiliar with the work of industry imply that skill is no longer an important factor in modern industrial practices. The failure of industrial management to discriminate carefully in the use of its classification terminology has further increased the lack of general appreciation of the importance of skill in industry. Fryklund in his study of "The Selection and Training of Modern Factory Workers" in 1934, wrote: "The older occupations are affected by new processes and inventions and new occupations are constantly appearing. Some of the trades are still in existence but the new types of workers arising as mass-production increases are not clearly distinguished in terminology or in duties from the older craftsmen. The first efforts to define the meaning of these terms revealed the greatest confusion. The common designators and payroll terms were found to vary greatly. Writers, too, appear confused and plant managers themselves are not consistent—the terms used in the several departments of the same factory often being inconsistent." He further says that "what constitutes a trade as distinguished from specialized industrial work should be perfectly clear to anyone who attempts a discussion of industrial training problems."[2] This is not only true, but it is equally important that the student of industrial education should be clear with reference to the meaning and importance of skill in both the trades and the semiskilled industrial occupations.

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[1] *School and Society*, Vol. 60, Nov. 24, 1945, pp. 339–340.

One of the most helpful studies of the importance of skill in industrial work is that made by Doctor Mildred Fairchild in 1930. The fundamental character of the study makes it as valuable today as when it was made. In it Fairchild found that "the present use of skill is probably greater by far than many persons realize"[3] and that in the three plants she studied "the conclusion from both the statistical analysis and the case study of this material is that where skill is given play, it becomes in the worker developing it much the greatest source of his satisfaction. Satisfaction in wage and satisfaction in conditions of work supplement it or not as the case may be. But definitely they tend to be counted as subsidiary. Where skill is not given play, satisfaction in wage or conditions do predominate in the workman's mind."[4] She further pointed out that skill is needed in modern industry both as a source of efficiency in production and as a factor in the psychological development of workers. On this point she said: "Philosophers and social psychologists today talk of the drive to power as a primary element in human activity. The development of skill is closely allied to the application of that native driving force. To develop a skill or technique in any line of activity, whether in music, art, sport, or industry, is to harness a torrent of rushing water and turn it to effective account. Skill is needed in industry today, not simply as a bargaining asset for the workman, nor only to supplement mechanical contrivances which have not yet been perfected to the point where they can do the entire work unattended. It is needed as a fundamental psychological requirement of the workman. And it presents a vast resource, which is now only partially exploited, for increasingly efficient production."[5] She pointed out in a later paragraph dealing with incentives that several types of incentives are effective, "but the results of this study suggest that failure to utilize men's capacity for skill development is like failure to utilize the capacity of a waterfall flowing past one's factory doors, or of the coal in one's bins to its fullest extent. It is a waste of natural ability directly at hand, whose use would be advantageous to everyone concerned."[6]

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[2] Fryklund, Verne C., *The Selection and Training of Modern Factory Workers*, Minneapolis, University of Minnesota Employment Stabilization Research Institute, University of Minnesota Press, 1934, p. 8.

[3] Fairchild, Mildred, "Skill and Specialization: A Study in the Metal Trades," doctor's dissertation, Bryn Mawr College, p. 61. Reprint from *The Personnel Journal*, Vol. IX, Nos. 1–2, 1930.

The conclusion one is impelled to reach from the Fairchild investigation is that skill is a vital factor, not only in efficient production, in successful personnel management, and worker satisfaction but in the personal growth and the ability of the industrial worker to express inner creative urges and powers of achievement. Modern psychology contains much evidence to support this conclusion. If it be sound, then industrial education at all levels should be concerned with the development of skill in work, whatever the immediate objective of the instruction offered. But what is skill? Not only are industrialists and many others confused with reference to such terms as "skilled mechanic," "skilled employee," and "semiskilled worker," but there is confusion in the thinking of many as to the meaning of skill. To some, skill seems to mean mere motor dexterity in the use of tools, machines, and materials. This meaning is far from uncommon among students and teachers of industrial education. It is not, however, what Fairchild was talking about, and Fryklund's definitions of skilled and semiskilled workers in industry indicate that his concept goes beyond mere motor dexterity. It seems clear to the present writer that for purposes of industrial education in both its vocational and nonvocational phases, to define skill as motor dexterity is both inadequate and injurious to the functions of this area of organized instruction. If it is no more than that, then perhaps Mr. Hutchins is right.

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[4] *Ibid.*, p. 42.

[5] *Ibid.*, p. 44.

[6] *Ibid.*

Skill is often defined as a habit. Professor Selvidge defined it as "a thoroughly established habit of doing things in the most economical way,"[7] and that is perhaps the most commonly held concept of skill. It certainly includes that. Pear, the British psychologist, who gave much attention to the study of skill development, defined skill as "the integration of well-adjusted performances, adapted under varying situations to the attainment of a desired result."[8] This definition goes beyond that of Selvidge by including the adaptation of the habitual performances to varying situations, the performances being governed by the desired result rather than merely by the habitual reaction to a situation. Fairchild said of this concept of skill, "While it consists primarily of habits, it is more than merely a congeries of habits. The habits, at least, must be the kind to ensure adaptation." And she further quotes Pear as pointing out that "skill, as distinct from habit, involves the ability to be aware of and to correct faulty adjustment. A surgeon's or an automobile driver's skill implies this. While it consists partly of habits, skill permits immediate interference with any single habit or combination of them."[9] This enlargement of the concept brings in knowledge, judgment, and the modification of the habitual actions. Some contend that this broad concept of skill merely adds to the confusion by including what teachers of industrial education have always called "related technical knowledge"; that the adaptation is merely the applying to the specific situation one's related technical knowledge, and the skill is still only the habitual manual dexterity of action. For purposes of both industrial education and job training, however, the broader definition seems to be more useful, and it coincides more accurately with the concept of authorities in industrial education of the meaning of "skilled mechanic" than does the narrow definition. It, furthermore, makes of the skill of the "semiskilled" mechanic something more than mere repetitive movements that render him only an adjunct to a machine or a cog in a wheel. It puts content into the teaching of skills and not mere repetition of motions until a habit is formed.

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[7] Selvidge, Robert W., "Skill," *Industrial Education Magazine*, Vol. XXX, No. 5, November, 1928.

[8] Fairchild, *op. cit.*, p. 3.

[9] *Ibid.*

When definitions of the grades or levels of industrial workers are considered, the importance of the broader definition of skill seems apparent. In the study by Fryklund referred to earlier, it became desirable to distinguish between two levels of "skilled mechanic," designated respectively as Class A and Class B. The report said that "Class A includes persons who are masters of their trades, thoroughly understand their assignments, and are competent to work without immediate supervision. Experimental jobs and the highest grade of production or tool work, requiring general knowledge of all machines, tools, and materials belong in this class. Thus jobs requiring the exercise of considerable judgment, of accuracy without the use of jigs, and of initiative within the trade belong to Class A mechanics.

"Class B workers are as efficient as those of Class A on certain jobs, but their work is partly planned and demands some supervision. The workers need to know machine speeds, materials, how to read blueprints and how to use precision instruments such as micrometers and gauges. Heavy but accurate work and small or medium-sized work requiring accuracy where tools are not present, fall into this class. Frequently work in this class becomes repetitive to the extent of a few parts, but it is not as highly repetitive as most of the work of the still lower class." In the case of the upper of the two classes of semiskilled operatives, there is also room for the exercise of a degree of judgment, since "the operatives understand the machines and can change tools when necessary."[10] In all three cases it is clear that related technical knowledge is involved and that skill is considered as being something more than mere manual dexterity.

Present and Future Importance of Skill. Skill, in its broader meaning, has throughout history been a vital factor in industrial production, and there is no indication either in present practices or in the foreseeable future that it is now or will become unimportant in industry. New industries are being developed that require skilled workers, and skilled workers always require extended training. Many specialized machines and models for new designs of manufactured products are built by highly skilled mechanics, in some cases largely by hand. It is inconceivable that a time will ever come when there will be no need for skilled mechanics to do such work for industry. The repair trades are growing in number and importance. As quantity production progresses, the repair trades necessarily grow larger to meet increasing demand for repairing the products of quantity production. These trades all require skilled workers. The custom trades, likewise, show no indication of decreasing in importance, and it is probable that man will always need their services. These trades include all the building trades, sign painting, tailoring, some of the specialties in the graphic arts, and all other trades that produce needed or desired objects for those who do not want or cannot utilize the standard products of quantity production. All the workers in these trades must be skilled in the broad sense of the term "skill." Hence, vocational-industrial education will probably always be concerned with the problem of the development of skill in the learner.

In industrial arts, or the nonvocational phase of industrial education, there is also a place for skill for its great educative value. The position, held by some who are advocates of an extreme type of progressive education, that skill is of no importance in industrial arts so long as the child is expressing his own idea in what he makes, is neither sound psychology nor good education. Except in the case of very young children it is evident that no one knows better than the young person himself when his work is inaccurate and unskillfully performed. If crude and inaccurate work is the expression of his idea, it probably would be better that such an idea not find expression. Children not only can recognize skillful work, but they take great pride in performing such work. Self-respect, joy in achievement, and the development of self-confidence are products of work skillfully performed. The wise teacher will encourage children to undertake only those projects that are within their powers to do well and will hold them to reasonably high standards of achievement in their undertaking. It is the writer's opinion that from an educational point of view any other practice is indefensible, except in the case of children so young that skillful work, even of the simplest kind, is not possible. To be skillful in all one has to do is a worthy aim of education, and the industrial-arts teacher is in a position to contribute much toward making it an ideal in the thinking and striving of his pupils.

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[10] Fryklund, *op. cit.*, p. 11.

It is highly desirable that all teachers of industrial education give careful attention to the meaning and significance of skill in their teaching. Skill is important both as a means and as an end in industrial education. It has always had such a place in schoolwork and in industry's training programs, but it is deserving of a far more careful study than teachers and those who work with learners in industry have devoted to it. What is skill? How is it best developed? What is its real value both in work and in its effects upon character and attitudes? These are important questions in industrial education.

Summary and Conclusions. The predominance of the use of machines in the quantity production of standardized products has led many educators to the erroneous conclusion that the training of skilled mechanics is no longer an obligation of organized education. Skill is greatly in demand in modern industry, and there is little evidence to support the belief that there will ever be a time when it is not needed. Skill is not only needed as a means of production, but it is an important factor in the education of an individual and is of great importance as a means of developing pride, satisfaction, and contentment on the part of the industrial worker. Much of the confusion in thinking about skill is due to a lack of understanding of the nature of skill. It is much more than mere habit of action. It involves the ability to modify habitual action to meet varying situations. This implies knowledge, judgment, and forethought and makes the development of skill a highly educative process. It is important in all phases of industrial education above the lower elementary levels of educative handwork. Much attention should be given by teachers and students of industrial education to the nature of skill and to the most effective means of developing it in the learner. Shop and drawing courses in industrial arts should be so adjusted to the abilities of pupils as to make possible and reasonable the maintenance of high standards of skill.

QUESTIONS AND ASSIGNMENTS

1. How do you account for the frequent failure of writers on education to consider the building, repair, and custom trades when drawing conclusions concerning industrial education?
2. How would you justify the belief that skill will always be needed in industry?
3. How can skill, as an ideal in all work, be developed in pupils by the teacher of shopwork in the schools?
4. Explain clearly the distinction between the definitions of skill given by Selvidge and Pear.
5. Explain what is meant by the statement that the development of skill has great educative value.
6. What are the important elements in the process of developing skill in school shop teaching?

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Chapter 9

THE DAY TRADE SCHOOL OR CLASS

After 1900 it became evident that a new point of view was influencing the thinking of educators with reference both to popular education and vocational education. The commission appointed by Governor Douglas of Massachusetts to study industrial education in that state made its notable report in 1906. That report produced a widespread and immediate effect on the thinking of leaders in both industry and education. It made clear that manual training, which so many leaders had thought would fully meet the needs of the nation for industrial education, was, after all, primarily a valuable new phase of general education and had relatively little value as specific vocational education for those preparing to enter the industrial occupations. It became clear that some kind of training designed specifically to prepare youth for jobs in industry was needed, and since the traditional apprenticeship was, for the most part, unorganized and unpopular, the situation seemed to suggest the development of special schools designed to train for the trades. The year 1906 also saw the organization of the National Society for the Promotion of Industrial Education, an organization that from the first stressed the need for what some of its leaders called "*real* vocational education." This emphasis led to a demand for specific vocational training in the public schools for industrial jobs and to an interest in full-time unit-trade schools as a means of meeting the need of industry for trained mechanics.

Development of the Full-time School. The full-time day trade school was, of course, a familiar type of institution to the leaders of the early 1900's since much attention had been attracted to such schools during the closing years of the nineteenth century. The New York Trade School was founded in 1881, The Williamson Free School of Mechanical Trades in 1888, the Philadelphia Builders' Exchange in 1890, The Baron de Hirsch Trade School in 1891, Drexel Institute (with a trade department) in 1892, and several other well-known schools before 1906. After 1900 a few such privately supported schools became public trade schools. Furthermore, these schools had been the cause of much controversy among educational leaders and among labor leaders. Labor was, from the beginning, suspicious of trade schools, fearful that they would be used to produce half-trained strike breakers and that they would result in oversupplying the labor market. There is little evidence that any very careful analysis was made before 1906 of the actual training needs for industrial workers and of the value of such schools to meet those needs. It was in 1914 that the first scientifically conducted industrial survey was made to ascertain accurately the needs for training. This survey was made in Richmond, Va., by the National Society for the Promotion of Industrial Education. Much interest in trade training was stimulated by the report of this survey. In 1902 and again in 1910 the annual report of the United States Commissioner of Labor was devoted to a comprehensive report of industrial education in Europe and the United States. These reports also excited much interest in the problem of trade education. Strangely enough, however, there was a widespread misapprehension of the character of German industrial education to which many looked for guidance in developing a program for the United States. Many leaders failed to realize that all trade training in Germany was part-time school training and not full-time trade-school training. Not before Kerschensteiner's[1] visit to the United States in 1910 was this error fully realized. Meanwhile much faith was placed in the value of the full-time trade school.

The development of such schools and of trade departments in high schools, before 1930, was continuous but very slow. Before that date the general continuation school, the evening school, and the part-time trade extension class received the major emphasis by vocational-education leaders. During the economic depression beginning in 1929 and the years since, however, the full-time day trade school has had a more rapid growth. This new development was produced, at first, by the inability of youth to find jobs in industry and later by two world wars and by the increasingly technical character of the skilled trades. Today, in spite of early predictions of leaders to the contrary, day trade schools and classes are growing in favor and importance as a phase of the total program of industrial education.

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[1] Dr. Georg Kerschensteiner, superintendent of schools of Munich and noted authority on industrial education.

Advantages of the Full-time School. Notwithstanding that it is axiomatic in all vocational education that no vocational school can complete the training of a practitioner in any occupation, there are certain distinct advantages possessed by the day trade school over apprenticeship and the part-time school. Among these is the advantage of continuous instruction under a craftsman teacher who is trained in the techniques of teaching. This is a value of far greater importance than is commonly recognized by advocates of part-time instruction as the only effective means of trade training. Continuous instruction with daily correction of errors and weaknesses in the learning process makes for thoroughness of knowledge and correctness of skills acquired. Furthermore, the teaching and learning are orderly and planned on the basis of a proper sequence of learning steps that can be followed with far more certainty than is possible in other types of trade training. The jobs, or projects, used as means of teaching and learning not only can be selected and arranged according to the learner's needs, but the time limits imposed for their completion can be adjusted to the learner's knowledge and ability at any given stage in his progress. This constitutes a distinct advantage over most programs of apprentice learning in industry. Perhaps one of the greatest values is the opportunity to develop desirable attitudes toward one's trade, toward one's civic and social obligations, and toward fellow workers. Continuous contact with a skillful teacher contributes much to the development of desirable ideals of craftsmanship in a worker who not only knows *how* but also knows *why* he performs his skills as he does.

Disadvantages of the Full-time School. There are, however, very important disadvantages in the full-time day trade school as a means of meeting the country's need for skilled mechanics. One difficulty at the outset is that of the numbers reached. Relatively few youth who go into the skilled trades are either willing or financially able to devote two or more years to intensive, full-time preparation for their vocation. Those who are willing and able to do so are likely to attend the general high school, hoping thereby to prepare themselves for vocations that they regard as being "above" that of the trades. In this sense the full-time trade school is in direct competition with the high school. In like manner the trade education division of the cosmopolitan high school competes for students with the other divisions of the school. Furthermore, the trade school faces great difficulty in keeping step with industry in the matter of equipment and techniques. Modern industry changes rapidly in these respects and unhesitatingly discards costly equipment and established techniques for new and better means of production. This is possible and desirable because of great savings in production costs and resulting increased profits. The schools, however, being supported by taxes and controlled by conservative boards of laymen are not able to scrap usable equipment and replace it with costly new machines and tools at frequent intervals. Furthermore, trade teachers are not always willing to leave their jobs and return to industry for experience in new techniques of production. This situation may result in the training provided by the full-time school being out of date, thus providing a handicap in readily placing its graduates.

Desirable Extent of Trade-school Training. The last mentioned disadvantage of the trade school brings to the fore the question of the character and extent of trade training desirable in such schools. Should the trade school attempt to reach beyond the fundamental processes of a trade, and is it important that it train its pupils in the use of the many specialized trade processes and machines? Because all trade-school graduates are required to spend the first two or three years after leaving the school as apprentices before being recognized as journeymen, it is probable that the school will render its most valuable service by thoroughly preparing its trainees in the basic processes of the trades taught and in the fundamental principles involved, leaving to subsequent apprentice training the newer and more specialized skills and technical facts needed by the journeyman. Employers not infrequently insist that the schools confine themselves to basic training and leave to industry the development of knowledge and skill in the latest procedures and specialized processes. In any case, it is important that the closest possible cooperation be maintained among the trade school, the employing industries, and labor. By such cooperation it is possible to avoid unnecessary duplication of effort and to promote effective training programs that make the experiences provided by the school and the subsequent on-the-job training supplementary to each other in the production of highly skilled mechanics.

Another aspect of the question raised, namely, the extent and character of trade training desirable in the full-time trade-preparatory school or department is: To what extent shall the trade school confine its work to preparing the pupil for his first occupational experiences, and to what extent for later advancement? Some industrial-education leaders have held that the school should be concerned chiefly and perhaps wholly with preparing the youth for his first job, while others have insisted that it should attempt to go further and try to prepare him for growth and promotion. In the one case the emphasis of instruction will be skill in basic processes and mastery of the minimum essentials of related technical knowledge. In the other, without neglecting the necessary skill and technical knowledge for a successful beginning employment, special attention will be given to breadth of technical knowledge, a variety of skills beyond the basic ones, and the development of desirable vocational attitudes. In the latter case time will be found for more extensive and intensive study of the physical and social sciences that underlie both the technical and social aspects of the trades being learned, and students will be frequently induced to look beyond the immediate future of their careers as skilled workers. To achieve the second of these aims requires more time than the first one and more broadly educated teachers. It is probable that both types of trade training should be provided to meet the varying needs of youth of different levels of intelligence and personality.

Importance of Flexibility. The all-day trade-preparatory school or department constantly faces the necessity of keeping its organization flexible and of being able quickly to expand or contract its program of offerings. Enrollments and the program of offerings needed vary greatly with the general economic situation. This fact constitutes one of the major administrative difficulties of the heads of these schools. When enrollments decrease rapidly in some trade courses, it becomes difficult to justify the investment in expensive equipment that is not being used and the salaries of teachers having very few persons to teach. When enrollments rapidly increase in some trade classes, there arises the need for obtaining additional equipment and for the enlargement of the teaching staff. Fortunately, extreme conditions of this kind rarely occur except in times of very unusual emergencies, such as periods of exceptional manpower shortages in industry or of great business depression and unemployment. Ordinarily programs that are based on carefully made surveys of local and regional industrial employment needs and trends can be quickly adjusted to temporary variations in the employment situation. Where the program of offerings is limited to basic training in well-established and generally practiced trades, the problem is less acute than where highly specialized courses are offered.

Types of Trade Training. To aid in meeting varying local needs throughout the nation the Federal authorities who administer the vocational-education acts providing Federal aid to the states have recognized several types of all-day trade training. In the 1948 revision of Vocational Education Bulletin No. 1, the following definition of types occurs:

"*Type A.* This type of all-day trade training is one in which the pupils devote one-half of the school day—not less than three consecutive clock-hours—to practical work on a useful or productive basis, with additional time given to instruction in segregated classes in the necessary technical and other related subjects. The instruction in related subjects shall have direct functioning value in the trade or occupation for which training is being given. Training of this kind may be given only in schools whch offer instruction extending over at least 9 months per year and 30 hours per week. Reimbursement may be made from either Smith-Hughes or George-Barden funds.

"*Type B.* This type of training differs from the type A only in the provisions for instruction in related subjects. In a type-B course, the related instruction is not given in segregated classes but by the shop teacher incidental to the shop work. The half day is not to be divided into definite periods for teaching related subjects, but such instruction shall be given as the needs for it arise in the shop work. The school shall be in session at least 30 hours per week and 9 months per year. Reimbursement may be made from either Smith-Hughes or George-Barden funds.

"*Type C*. This is a special type of all-day preemployment trade training which may be organized for persons over 18 years of age or for those 14 years of age or over who have legally left the full-time school. Such training may be offered for any length of time. The George-Barden Act specifically states that such a class may be operated for less than 9 months per year, for less than 30 hours per week, and without the requirement that a minimum of 50 per cent of the school time must be given to shop work on a useful or productive basis. Type-C training may be reimbursed from George-Barden funds only. This provision of the George-Barden Act makes it possible to take care of such different situations as follows:

"1. A demand for training single-purpose operators. Intensive training can be given to equip learners with the basic skills, technical knowledge, and related industrial information which will enable them to get a job, hold it, and advance in the industrial occupation without regard to attendance 30 hours per week during a 9-month school year.

"2. Training opportunity to meet the special needs of persons over 18 years of age who wish brief intensive preparation for entrance at the beginning level into industrial employment. Such training will be less comprehensive and complete than that given in all-day trade preparatory courses.

"3. Intensive courses operated 6 to 8 hours per day for relatively short periods of time and organized to prepare trainees for entrance into employment where the special job requirements are of such nature that the equivalent of such training would enable those trained to enter industry and meet definitely explicit job requirements. Preparation for specific jobs that require special testing or inspectional

> skills, as well as production skills, could be included when justified by local employment opportunities."

There is also recognized for reimbursement a special type of all-day class suitable for small communities where none of the three types defined above is feasible. This is known as the "general industrial course" and is described officially as follows: "A general industrial course may be organized to give specific preparation for a single occupation under an occupationally competent instructor in a group where shop instruction in several closely allied trades is conducted simultaneously. This designation is particularly adapted to the small community as an alternative to establishing unit trade courses. Instruction might be given in such allied trowel trades as bricklaying, plastering, and cement finishing. Each student enrolled should receive shop and related instruction as nearly like that of a unit trade course as possible, and may receive instruction in a single trade or in the occupation as practiced locally.

"A general industrial course may be organized to give preparation for one or more production jobs that do not fall into the trade classification. This instruction should be furnished by a teacher who is occupationally competent in the field for which the job training is to be provided. The instruction is organized for a group who are preparing for one or more types of closely allied production jobs. A general industrial course of this type is intended to prepare workers for employment in an industry in which entrance depends on ability in a variety of production skills peculiar to that industry so that prospective workers will be able to take their places in the industry as assemblers of small parts, punch press operators, coil winders, drill press operators with jigs and fixtures, inspectors or similar positions. They may receive training in such processes as soldering, spot welding, drilling, forming, polishing, riveting, assembling, and similar production operations. General industrial courses will be organized to meet the standards of type A or of type B day trade training."

Notwithstanding the difficulties involved in the establishment and administration of all-day trade schools or classes, there is obviously a need for this type of industrial training. It has played an important role throughout the history of industrial education in the United States since the development of the earliest trade schools of the last years of the nineteenth century. As new trades continue to appear and the age of entrance on productive work continues to rise, it is probable that there will be a need for such schools and classes for years to come. The increasingly technical character of the skilled trades and particularly of the new trades suggests a growing need for preemployment training. Improved teaching techniques may well shorten the time needed for preemployment training, but such training followed by some type of on-the-job training provides the ideal procedure for preparing youth and young adults for skilled industrial trades.

Summary and Conclusions. One of the oldest forms of school trade training in the United States is the full-time day trade school. Most of the early efforts to meet the need for more skilled mechanics took that form. Such schools have the advantage of providing orderly, continuous instruction by skillful craftsman teachers, and the training provided is more likely to be well rounded and complete than in other types of trade instruction. However, relatively few can receive the benefits provided by such schools, and it is difficult to keep them equipped with the newest types of tools and machines. Even the best full-time trade schools or trade classes in a cosmopolitan school cannot complete the training of skilled mechanics. After graduation from a trade school it is still necessary to serve part of an apprenticeship. Because of the breadth and thoroughness of trade-school preparation, however, the youth who enters his trade with such background of training is in a much better position to achieve advancement than one lacking it. Modern needs have necessitated the development of various types of full-time trade classes to meet varying requirements of modern industrial employment. Trade-school training followed by apprenticeship provides excellent preparation for successful work.

QUESTIONS AND ASSIGNMENTS

1. How do you explain the fact that philanthropists and industrial leaders of the 1880's and 1890's were chiefly interested in full-time trade schools as the way to meet the need for skilled industrial workers?
2. Examine the chart published by the Office of Education showing

the enrollments of the several types of industrial schools and classes, and explain the major changes in direction of the curves that represent the several types of classes.

3. Contrast the advantages of the full-time and the part-time types of industrial school offerings.
4. Should the full-time trade school train only for successful work in the pupil's first job or should it try to train for advancement in industrial work? Give your reasons.
5. In view of present-day trends in industry what do you believe will be the future of the full-time day trade school?
6. Why is it necessary to supplement full-time trade-school training with an apprenticeship before one's training is adequate for successful work in industry?

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Chapter 10

PART-TIME SCHOOLS AND CLASSES

Fundamental Character. In a very real sense part-time education is the normal human means of learning and progressing in understanding and achievement. Throughout the ages man has acted in his efforts to meet needs, has reviewed his actions, and as a result of thinking about either their failure or success has been able to plan new and more skillful actions. There seems to have occurred throughout human history a continuous alternation of thinking and experimental action. It is chiefly by means of this process that human progress has been achieved. There is little evidence in history of the value of long periods of concentrated thought and theoretical study as a means of producing successful action, but rather does the evidence point toward the efficacy of short periods of alternation between considering, experimenting, criticizing and analyzing the experimental effort, and planning the next experimental action. One cannot study the history of the bridge, the ship, the steam engine, weapons of warfare, machines of production, the telephone, the automobile, the airplane, or any other practical achievement of the race without being impressed by the "part-time" character of man's learning and producing. The human mind seems normally to work in that manner. Seldom, if ever, is it possible to solve all the problems of invention and production in the mind before productive action begins. It is probable that this fact is the major element in the universally recognized effectiveness of well-coordinated part-time education. In fact it is doubtful that there can be any other kind of genuine education. The amazing facility with which factual materials taught in full-time schools are forgotten, and therefore not used when needed in subsequent life, suggests the doubt. Experience with life seems clearly to indicate that knowledge acquired when there is a felt need for it and when it is translated promptly into action is not only longer retained by the learner but is more fully understood than when learned at any other time. Part-time education is therefore likely to be a more effective means of acquiring knowledge and skill and the ability to apply them than the traditional full-time school procedure of teaching and learning.

Essential Features. To be effective, part-time education must have certain essential features. Merely to alternate study in school and practical work in an occupation will not necessarily result in effective learning and in intellectual and vocational progress. To achieve the best educative results there are at least three features that must characterize a part-time education plan. First, there must be a planned progression in the activities engaged in on the job. A haphazard series of experiences in the occupation one is attempting to learn greatly lessens the value of the part-time program of teaching and learning. The plan for progression of experiences need not be rigid, but there should be a continuing movement toward greater demands upon the skill and intelligence of the learner. Second, the progression of learning experiences on the job must be known to the teacher of the part-time pupil in the school so that his teaching can be specifically related to the learner's job experiences. It scarcely needs to be pointed out that such teaching to be effective, therefore, must be timely, and this suggests the third essential, namely, that a coordinator is always needed in a part-time program—someone whose business it is to bring about the timely relating of what is taught in school with what is experienced on the job. Where these three features of a part-time education program exist, one will find a highly effective teaching and learning occurring. In the field of industrial education there is no better means of training for successful work. It possesses most of the major elements of apprenticeship at its highest level of success. The only feature of the best medieval apprenticeship that is lacking is the father-son relationship between the apprentice and the master, and this lack is partially supplied by the coordinator.

Types of Part-time Instruction. The Federal acts providing aid to the states for promoting and maintaining industrial education recognize several types of part-time instruction schemes. The names given to them are (1) the part-time general continuation class, there being two subtypes, namely, Type A, that is not a cooperative scheme, and Type B, that is a cooperative type usually called "Diversified Occupations"; (2) the part-time trade-extension class or program, of which there are two types, the non-cooperative and the cooperative type; (3) the part-time trade-preparatory class. The part-time general continuation class or school as originally organized was for out-of-school, employed children between the ages of fourteen and sixteen and was designed to "enlarge their civic and vocational intelligence." The Type B class is for youth over sixteen who work part-time at various occupations and attend full-time school part of the time under a scheme of cooperation between employers and school officials. The part-time trade extension class is designed to give to employed workers in industry instruction needed to enlarge their knowledge of their work and to increase their skills and competency. It may be used for instruction of apprentices, journeymen, foremen, semiskilled workers, and others in industrial occupations. The special subtype known as "cooperative part-time trade extension" differs chiefly in that all students in a given group are engaged in the same trade, and while half are in school, the other half are at work in industry, and they change places at regular, stated intervals. The part-time trade-preparatory program of instruction is designed to prepare employed persons to enter trades or industrial occupations other than those in which they are or have been employed.

General Continuation Schools. The general continuation school during the years between the close of the First World War and the economic depression of the early 1930's was the type that in many sections of the nation received major emphasis. It was designed to serve the needs of children between the ages of fourteen and sixteen who were not attending full-time schools and who were employed. At that time there were many thousands of such children and these schools met a real need. They were not trade schools in the sense that they attempted to train for specific industrial occupations, but they were planned to contribute to the further general education, the citizenship, and vocational success of employed children. Such children were, of necessity, employed in jobs that were juvenile in character, hence, of no great economic significance and no future, except as success in them might train for later success in adult employment. The general continuation school, therefore, was not concerned with specific job skills and technical knowledge but rather with the development of good work habits and attitudes. It sought to develop the ability to read with reasonable understanding and to write with essential clarity of expression, and it fostered the acquisition of sufficient knowledge of the geography and government of the nation to enable the worker to discharge the elementary duties of a citizen. Finally, it taught good health and hygiene in an attempt to maintain the health and cleanliness of the workers and members of the family. The courses offered varied in number and character and were taught so as to be of the most immediate value to working boys and girls. The familiar devices of "passing" and "failing" and "promotion" were eliminated, and the entire emphasis was placed upon helping boys and girls, who were working in stores, offices, and industry and who had juvenile jobs of various sorts, to do their work better and to advance physically, intellectually, and morally as far as possible in the brief time available for instruction. In some states general continuation children attended school only four hours per week, and in others, eight hours. These schools usually operated under compulsory attendance laws. The administrative problems were complex and difficult, and there was much opposition in many instances to these schools from both parents and employers, but in the main they were highly successful, and great good was accomplished in the lives of thousands of children who had left the full-time school as failures or because of economic need. Only a few of these schools remain at the present time in the original form, due to many changes in the economic life of the nation since 1930, to changes in Federal and state regulations of child labor, and to a trend among the states to raise the compulsory full-time school-attendance age to sixteen. The methods of teaching and organization of curriculums were unique and highly effective and provided a valuable experiment in educational procedure that, if they were better known, would be of much interest to all educators. The present-day type of the general continuation instruction that is rapidly growing is known as the "cooperative" or "diversified-occupations" program.

Diversified Occupations. One of the most important developments in the vocational-industrial education program during recent years has been the federally aided diversified-occupations program. This program is designed for high-school students who expect to engage in some vocation immediately following their graduation. The program makes possible training in employment while they are attending high school and without losing credit toward graduation. It is an effective means of providing work experience as a phase of education, thus, in part at least, supplying one of the great educational needs of youth that modern economic and social life has denied to most young persons. The usual plan of the program is to aid those junior- and senior-year students who desire to participate, to obtain employment for a half day each day in the occupations they want to learn. The other half day is spent in school in the regular required high-school subjects and in subjects specifically related to their occupations. The related subjects are taught by the coordinator, who is employed as a regular member of the faculty to give full time to the program. The coordinator is responsible for counseling the students in the program, for aiding them to obtain jobs, for planning, with the employers, the learning experiences to be provided by the work on the job, for acting as a liaison agency between the job and the school, for teaching the related subjects, for generally assuming responsibility for the operation of the program, and for seeing to the welfare and educational progress of the students. The coordinator is obviously the key person in this scheme of vocational education. His training and personality are the major factors of success or failure. It is important that he shall be well educated both in general education and in professional education and that he shall have had successful industrial employment experience in addition to teaching experience. It is desirable that he work under the authority of the industrial-education administrator of the school system, both because of the nature of his duties and his opportunity to be of assistance to the administrator because of his close contact with employment conditions in the community. The contributions of the diversified occupations program to the vocational guidance of the students, to their vocational education, to the motivation of their schoolwork, and to their occupational adjustment after graduation are obviously very great. There are also important values in this type of school offering for the total program of industrial education of the school system.

The most extensive day-trade-school offerings include training courses in a relatively small number of occupations. The cost involved in providing equipment, materials, and instruction in a large number of trades is prohibitive in most school systems, and the relatively small number of students seeking training in some of the trades makes the per capita costs of full-time day-trade-school instruction excessive. The diversified-occupations program, however, is limited only by the willingness of employers to cooperate with the school by employing part-time students and by the number and variety of occupations represented in the community. Hence, this program can often be used to fill the gaps in the day-trade-school offerings. The success of the diversified-occupations phase of the industrial-education program has been notable wherever it has been well administered, and it is one of the most promising features of modern secondary education. Its contribution to the general education of the students participating in its program is in many instances fully as important as its contribution to their vocational education. Of the numerous values of this activity that are generally recognized perhaps the two most important are its ability to hold many students in school to graduation who, without such a program, would leave school early and enter work life wholly untrained for any occupation, and its very great occupational adjustment value. It thus makes a major contribution at one of the most strategic points in the life of the youth of today by holding them in school till they can be trained to enter occupational life with some hope of initial success and by helping them at a most critical place in their economic careers to become adjusted to modern vocational life.

The Part-time Trade Extension Program. The part-time trade extension program has been from its inception an important feature of public-school industrial education. Its function is, as the name implies, to extend the trade competency of those already engaged in the industrial trades either as journeymen who desire to increase their trade knowledge and range of skills or as apprentices who need phases of trade training not available at their places of employment. Of course the evening trade extension program performs the same function for many, but it constitutes a special type of part-time trade extension school because it is in operation only during hours other than the regular working hours of employment. The part-time trade extension classes are in session during the working hours, and attendance on them may necessitate the student's absence from his job. As indicated in an earlier paragraph, this program, to be effective, requires close cooperation between the school and the employer of the part-time student. It is the part of the school to teach the materials that are related to the work skills and the learning acquired on the job. These related materials may be of numerous kinds. Their character depends upon the particular trade being learned by the apprentice or the trade in which a mechanic desires to improve his knowledge and skill. Usually it deals with those parts of mathematics needed in the trade, phases of the physical sciences that a first-class mechanic in a given trade should know, or it may deal with the reading of blueprints, with factory hygiene, and labor laws; in some cases it deals with specialized skills not readily available in the plant or on the construction job and any other knowledge that is related to the worker's vocation and that can better be taught on a part-time basis by the school than by other workers on the job. As indicated above, the timeliness of the related instruction is a factor of its effectiveness, and it is important that someone shall be responsible for the close coordination of the instruction given in school with the learning that takes place while on the job. The importance of such coordination implies the need for a plan of progressive learnings on the job. This is especially true in the case of apprentices. It is also highly desirable, if not essential, that in all part-time trade extension programs there shall be an advisory committee to oversee the operation of the program. Such a committee should be composed of an equal number of representatives from labor and from employers, with the director of industrial education, or a special coordinator representing the school, taking the initiative in setting up and administering the program. It is also important that the teachers who give the instruction in the related materials shall be specially trained for their duties and shall be fully conversant with the work being done by the students in their employment.

Cooperative Part-time Trade Extension Programs. The close relationship between the learnings on the job and those in the school are fully as important in cooperative programs as in the noncooperative scheme of organization. The advantage in such a program is the possibility of greater concentration of instruction and of job experience, particularly if the alternate periods are a week or more in duration. In those trades that require a large amount of technical knowledge and skill, but relatively little manual skill, there is also an advantage in this scheme over the usual allocation of school time in the noncooperative plan. The necessity for advisory committees and a coordinator is equally as important a consideration in planning this type of training as in the other type of trade extension program. It has the disadvantage of being difficult to administer and maintain over a long period of time because it involves the employment of two persons for each job if there is to be no interruption in production, and, in any case, there is of necessity a shifting of personnel on the job at the end of each alternate period. Where there is full cooperation with the school on the part of employers, it is a very effective means of industrial training, but where such cooperation is lacking, it presents great difficulties. Also, where the alternate periods are very long, the close correlation of school instruction with the job experiences is not so easily maintained as when the periods are shorter. This is true because of the larger amounts of instructional materials presented in the school, and likewise the greater number of work experiences on the job during the longer periods.

Part-time Preparatory. The trade-preparatory type of training program is chiefly valuable as a means of enabling an employed person to prepare himself to enter a different industrial occupation without having to give up present employment while learning the new type of work. Because of the part-time character of the instruction and its lack of relationship to present employment, it cannot be so effective as either trade extension or full-time day-trade instruction. Such a scheme cannot be expected to do much more than provide the minimum knowledge and skill necessary to begin employment in the new occupation, unless the new work is very closely related to that of the present job. This relatively new type of part-time training can best meet the need of those engaged in the semiskilled jobs in industry and those working toward promotion to jobs requiring technical knowledge built upon the work of the present job.

Advisory Committees. It would be difficult to overemphasize the importance of advisory committees as a feature of all types of vocational-industrial-education programs, and they are a practical necessity in the case of part-time trade extension programs. In such a program the employer is asked to participate, through the work he provides the learner, in the training of industrial workers. In many cases the employed learners are indentured apprentices. Hence, the employer not only has a financial stake in the enterprise but a definite part to play over a term of years in the program of training. He is also concerned, as a prospective employer of the product of the program, with the quality of the workmanship resulting from the training. He therefore should have a voice in the planning and administration of the program. Labor groups also have a vital interest in the whole training scheme. They are concerned with the matters of how many are trained, in what trades or skills training is given, who gives the training, the rates of pay provided the learners, the length of time given to each phase of the program, and the quality and range of the instruction. They therefore must have a voice in all phases of the planning and operation of the program. The third party in the enterprise is the teacher or the school. Usually it is the school, acting through the administrator of industrial education, which has to assume the initiative in bringing together the other parties and in launching the whole scheme in the community. This administrator is the one responsible for organizing the advisory committees and seeing to their proper and continuous functioning and for executing the plans suggested by the advisory committees. While he represents the superintendent of schools and the board of education, he also plays a major role in carrying out the desires of employers and labor. It is interesting to observe that when employer, labor, and the school are working together to train the learner, the nearest approximation possible under modern conditions to medieval guild apprenticeship is obtained. Under guild apprenticeship, when at its best, the master craftsman was at once teacher, employer, and representative of labor. The industrial revolution split these functions into separate agencies, and the advisory committee scheme goes far toward reuniting them in a unified agency for the training of young industrial workers. The most effective training of the apprentice is not possible unless the three functions operate in close cooperation.

The Part-time Student. The success of any type of part-time industrial school or program depends in large measure upon an understanding of the characteristics of employed youth and adults who attend such schools and classes. It is necessary, first, to recognize that these students are usually different in attitude and purpose from the full-time school student. Secondly, it is essential that the courses of instruction, methods of teaching, and attitudes of the instructors shall be appropriate for dealing with the special type of student involved in the part-time school situation. The part-time student is an employed person working for wages and as such, even when quite young, has a feeling of independence that the young person of the full-time school does not possess. Furthermore, he is not attending school merely because it is the customary thing to do but because he has agreed to do so as part of his employment contract, or of his apprentice indenture, or because he has a strong urge to advance himself in his job. This fact causes him to have a different attitude toward the instruction offered from that of most young persons in the full-time school. For the most part he is impatient of instructional materials and procedures that are not obviously and presently valuable to him. Deferred values, however eloquently urged by the teacher, make little appeal to the part-time student. The most persistent question in his mind seems to be, "Of what good is this to me now?" This attitude presents a challenge to the teacher that requires thorough understanding of the worker's point of view, much patience, and much teaching skill. It makes urgent the planning of courses so that, as far as it is possible to do so, each class meeting results in the learning of something that has obvious value to the student in his occupation. It is also important that as far as possible each lesson taught should stand alone as a learning unit not unduly dependent upon the lesson that preceded it nor merely a preparation for the one to follow. The part-time student wants to take from the school experience each day something he has learned that he can use.

Because of his attitude toward the offerings of the school he is likely to be extremely critical of the materials provided and the quality, from his point of view, of the teaching procedures; and he is seldom slow in expressing his disapproval, either orally or by his behavior. If he is not obligated by law or his contract to continue in part-time school, he promptly drops his work when he feels that he is not receiving the kind of instruction he thinks he needs and wants. On the other hand when he thinks that he is gaining much practical value from his school experience, he easily becomes a most enthusiastic student and often will exhibit remarkable ability to learn and progress in his schoolwork. One further characteristic that is important for the school to take into account is his feeling of independence and importance as a wage earner. He resents being treated as a school boy, even though he may behave much like one on occasion. This fact presents a real difficulty to the teacher at times, but where the work is obviously meeting felt needs, there are few behavior problems with which the school has to deal. When the student is an indentured apprentice, the labor union usually assumes responsibility for his regular attendance and his behavior as a learner. On the whole the part-time student is an interesting person to teach, and a good teacher finds working with him a most rewarding experience. He is at the place in his life where effective teaching brings early returns that are clearly discernible in terms of his growth as a citizen and progress as a worker.

The Part-time School Instructor. The characteristics of the part-time student imply much with reference to the qualities needed in the part-time school instructor. Perhaps the first essential is that he must be able fully to understand the attitudes and desires of the wageworking youth and adult from having had similar work experiences in industry. Only the exceptional person can fully grasp the attitude of these students toward life, work, and school without having had experiences that are similar to those through which his students are passing. For this reason part-time school teachers are usually required to have had work experiences in industry. The teacher wth a wholly academic or school background finds great difficulty in selecting and organizing instructional materials that have real meaning and value to working youth and adults. Furthermore, such a teacher is not likely fully to appreciate the attitude that causes these students to demand immediate returns on what is learned and that produces a corresponding resistance to instructional materials designed chiefly to produce future values. The part-time student is usually quite "immediate-minded," as the older psychologies expressed this quality. To meet the needs of such students the teacher must be fully acquainted with the problems they are encountering day by day in industry and must be able to interpret the materials presented in the school in terms of those problems. This does not mean that the instruction should not go beyond present daily needs but that it must start with those needs and progress in such fashion that its practical values are apparent to the student. This requires an extensive knowledge of modern industrial processes as well as an understanding of the related materials needed by the student both to do his present work well and to prepare him for progress in his vocation. However, it is important that the teacher be able to resist the temptation to run too far ahead of the student's present desires to know. This suggests the importance of that supposedly unscientific quality known as "common sense" among the teacher's qualifications.

The teacher's problems, however, are not all related to methods of teaching; the selection, organization, and preparation of instructional materials also constitute major responsibilities of the part-time school instructor. As has been indicated earlier, the selection of materials must be determined by the teacher's knowledge of the actual and specific needs of the students, as revealed both by the student's expressed desires and by his own experiences in and understanding of modern industrial practices. When so determined, the first essential step toward effective teaching is made. The organization of the materials selected involves a recognition of the importance of correlating in point of timeliness the units offered at any given stage of the school experience. As far as possible a given unit of instruction should be offered when the student's work in industry causes it to be needed. Where it is not possible to make the related instruction correspond exactly in point of time with the need, it should be related as closely as possible. To do this the teacher has to maintain continuous contact with the work being done in industry by his students, and it follows that his schedule of teaching should be arranged to make possible frequent visitation to the work places of his students. Even where a coordinator is employed, the teacher should be able to maintain such contacts with industry. It is perhaps hardly necessary to point out that the instructional material should be organized in short units.

Preparation of Instructional Materials. The preparation of the instructional units requires much work and professional skill. Since all teaching and learning is individual in character, it is important that the units be prepared so as to meet individual needs. This is particularly true with respect to differences in the time individuals require for understanding and mastery and with respect to the variations in ability to read or to listen to instructions with comprehension. It follows that both oral and written instruction must be prepared. Where suitable printed texts are not available, each unit should be carefully prepared in the form of individual instruction sheets. The teacher often needs help in preparing these sheets from someone trained in the writing of simple, clear, concise language. Few have this ability, and the part-time school instructor need feel no embarrassment in seeking such assistance from someone who possesses it. Before duplicating the instruction sheets they should be tested by using them with a small selected group of students to determine whether they are perfectly clear. Individual instruction sheets make it possible for slow students to reread the units as often as necessary and for rapid students to move on to new units without being held back unduly by slow learners. Their use frees the teacher to give more time to the instruction of those most in need of his help. The preparation of this type of material requires much out-of-school time, but once it is done, it more than justifies all the time and effort invested in it by the teacher.

Importance of the Teacher. The teacher of part-time students has the opportunity to render a service of great importance to the economic and social life of the nation. If he has the character and personality that he should possess, he is in a position to influence the lives of hundreds of ambitious young persons who will play an increasingly vital role in American industry. To do his part effectively the teacher needs not only thorough training but the drive and ability to carry on a continuous project of self-education. His place in the educational program of the nation is a difficult one to fill acceptably, and it is essential that he fully realize its importance. As in all other phases of the school enterprise the success of the part-time school program depends chiefly upon the character of the teachers and the quality of their work.

Administrative Essentials. In the preceding section the great importance of the teacher's function in part-time industrial education was stressed, but it is evident that in any school program the success of teachers is always conditioned by the quality of the administration under which they work. The part-time school by virture of its inherent character presents unusual administrative difficulties. Any undertaking involving cooperative action by agencies having diverse functions and purposes is especially difficult to administer. In the case of the part-time industrial education program, as earlier shown, three distinct agencies are concerned, namely, labor, the employer, and the school. Each is organized and operated for a distinct purpose, almost wholly different from the others. The labor union seems to regard its function as that of protecting and promoting the welfare of that portion of the laboring population belonging to its organization, and it is only incidentally concerned with the improvement of the trades or industrial occupations practiced by its members. Industry is primarily concerned with production: first, for profits; second, to supply the needs of the people for the products it supplies; and only incidentally with the training of its employees—and its interest in training is not primarily the good of the employee. The school is concerned with the education of children, youth, and adults to the end that they and society may progress toward higher levels of civilization in all its significant aspects. About the only element that is common to the three agencies is that they are all concerned chiefly with human beings. Yet the success of all three depends upon the effective education and training of the persons who produce and those who consume and control the products and services of all three. It is this fact that offers the opportunity for cooperative action and skillful administrative work in bringing about and maintaining the desirable degree of cooperation among the three. The focus of the enterprise must be upon the person to be trained through the efforts of the cooperating agencies. The administrator's job, then, is to create and maintain a type of cooperative effort that will enable each agency to perform its part in the training and occupational adjustment of the trainee, who is at once a school pupil, an industrial worker, and a loyal member of the labor group. To render this service effectively requires tact, administrative ability, skillful planning, and a broad knowledge of modern economic and social problems. It also requires for the highest success a philosophy of life, of society, and of education that will enable the administrator to understand the full meaning of his function and that will help him to see far beyond the routine details of his daily activities. As the responsible leader of the part-time program it is important that he never permits himself to lose sight of the welfare of the part-time student as his primary function. The temptation to devote oneself to the mechanism of the program should be resisted, and all important decisions should be made wholly with reference to what will be best for the student. The claims both of industry and of labor will occasionally clash, for the moment, with the best interests of the student. When this occurs, it is the job of the administrator to be the advocate of the student, and so long as he strictly maintains this position, he is likely to be successful as the coordinator of the program. The moment he steps to one side or the other of this position, he endangers the success of the entire program. The key person in any part-time program is the one who administers the program. It is perhaps obvious that he should be trained for his work, that his background of experience, his knowledge, and his personality must be such as to command the respect and confidence of all the three agencies whose activities he attempts to coordinate in the interest of the part-time students.

Factors of Success in Inaugurating and Maintaining a Program. Experience has revealed certain pitfalls that it is well to avoid when trying to begin a part-time industrial-education program. Among the first steps the administrator has to take are the holding of conferences with employers and with local labor leaders. In both cases, but particularly with reference to the labor groups, it is important to go before them with a well-planned statement of the need, but not a complete plan for meeting the need. It is far better to discuss with them the whole problem of the training of employed persons by means of some cooperative enterprise and to let them aid the administrator in developing a program. The program finally agreed upon may well be the one desired from the beginning by the administrator. However, to go before a labor group, and to a less degree, a group of employers, with a detailed plan that the administrator tries to "sell," will almost invariably produce resistance and may result in complete failure. After the plan for a part-time program is agreed upon and an advisory committee organized, it is important that the committee shall be frequently consulted and kept informed at all times with reference to both the problems and the progress of the program. The temptation to ignore the advisory committee when the program is operating smoothly must be resisted if the administrator wants its help when trouble arises.

Because of the diverse elements involved in all types of part-time programs, carefully planned publicity released at frequent intervals is also an important factor of success. These programs never fail to be interesting to the general public, as well as to the members of the important economic groups directly involved; and besides, it is always helpful to have local taxpayers informed about the character and success of any important school program. As has been suggested earlier, part-time programs are inherently difficult to maintain, and favorable publicity is always a helpful means of keeping them operating at a high level of effectiveness. Finally, it is important to obtain and to maintain the interest of both school officials and teachers, including those who have no immediate relation to the program. The part-time students need to feel that they are fully accepted members of the student body, even though they spend but few hours in school during the school week. This feeling can best be fostered when all the personnel of the school recognize the part-time program of study as a normal and legitimate phase of the total educational program of the school.

Summary and Conclusions. Part-time education is the normal means of human learning. Men have always advanced by trying to meet needs, considering their failures and successes, and trying new ways to overcome difficulties and failures. The alternation of purposeful action and the consideration of the results have been man's method of progress throughout the ages of human history. Hence, the part-time school is in harmony with man's natural manner of working and learning. For a part-time program to be effective there must be a close and timely relationship between the work the student is doing in industry with what he is being taught in school. To achieve the best results it is important to organize advisory committees composed of representatives of the three essential elements of any type of part-time training program, namely, labor, industry, and the school. The several types of part-time programs are designed to meet the needs of the several types of workers. The part-time school to be successful must not be subject to the traditional school devices such as "passing," "failing," and earning "grades." Its purpose must be restricted to meeting specific, individual needs of employed youth and adults. Coordination of experiences and cooperation of efforts are the keys to part-time-school effectiveness. No other type of school is more difficult to administer, and in no other is skillful administration more necessary for success. Teachers must be at all times fully cognizant of the experiences of their students as workers in industry. Courses should be organized in short units of instruction, and each unit should provide, as far as possible, usable material for which the student feels immediate need. Few other teachers in the school system have a greater opportunity to render important service to society than does the part-time school instructor. The outcomes of much of his work are immediately observable. His teaching occurs at a strategic point in the lives of his students, and when his work is well done, he can be certain of important, constructive results. The part-time school will certainly play a major role in industrial education for many years in the future. All the significant elements in present-day economic life point toward the growing importance of these schools.

QUESTIONS AND ASSIGNMENTS

1. Explain with illustrations how the part-time procedure of learning and working has produced human progress throughout the ages.

2. What type of part-time school program seems to be most important for your home state? Explain your answers.
3. What effects do war and high-employment conditions have on part-time school enrollments? Give reasons for your answer.
4. What are the elements of the present economic situation that suggest a change in part-time school enrollment? Which of the several types of part-time programs are most likely to be affected?
5. Point out the special values of the diversified occupations program (*a*) as a means of general education and (*b*) as a means of vocational education.
6. Make a list of the duties of a coordinator and of the qualifications he should possess. Explain the reasoning back of your selection of items.
7. If you were an administrator with the duty of selecting a teacher of related mathematics for a part-time school, what training and other qualifications would you look for in applicants?
8. Why is the advisory committee of special importance in the development and maintenance of part-time school programs?

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Chapter 11

THE EVENING INDUSTRIAL SCHOOL

Importance of the Evening School. A renewed emphasis upon adult education during recent years has caused special attention to be directed toward the evening school. Much of the new interest has been in offerings of various types of general education, but the general interest in adult education has also stimulated renewed attention to evening courses in industrial education. The rapid expansion of established industries, the creation of new industries, the extensive shifting of industrial workers from one section of the country to another and from one industry to another, and the general unrest and uncertainty that have characterized the present era all serve to emphasize the need for opportunities for supplementary industrial training for great numbers of industrial workers. One of the most effective means of meeting this need has been and is the industrial evening school. Notwithstanding the difficulties involved in organizing and maintaining effective evening-school instruction and the rather general lack of understanding on the part of school administrators of the factors of success in evening-school instruction and management, these schools continue to be the best solution to the problem of meeting the training needs of those workers who desire to upgrade themselves vocationally. From the long history of the industrial evening school there have emerged several principles that govern success both in organization and teaching techniques. These principles constitute a part of the professional knowledge that all teachers and administrators of industrial education should possess.

Early Evening Schools. The evening school as a phase of industrial education in America is not new. Records indicate clearly the existence of such schools in the Dutch Colony of New Netherlands before 1674. As early as 1690 an indenture of apprenticeship in Harlem stated that the apprentice "shall have the privilege of going to the evening school."[1] In 1701 another New York indenture included among its provisions the expression, "in the Evenings to go to school each Winter to the End he may be taught to write and read."[2] Seybolt states that he found 108 New York City indentures of the years 1698–1727 that refer to the practice of sending apprentices to evening school.[3] That evening schools were quite common throughout the colonial period seems clear, and it is evident that they were chiefly vocational in purpose, supplementing the daily work of apprentices and others engaged in the customary occupations of the times. The range of subjects offered was large and the organization flexible, the controlling purpose being chiefly that of meeting the vocational-education needs of those who were engaged during regular working hours and who lacked the necessary elementary and technical education for advancement in their chosen occupations. It is evident that the colonial evening school was an important factor in the industrial education of that period.

Modern Development of Evening Schools. Throughout the history of industrial education in the United States the evening class has been accepted as the obvious means of supplementary education for the working person who is unable to receive full-time school instruction in his vocation. As a means of industrial education it deserves most careful study because of the large numbers of youths and older persons who look to it for needed education and because of its possibilities for effective service under modern industrial conditions. Evening schools are now to be found in most large cities and in many small communities. They are conducted by both public and private agencies. The range of their offerings is remarkable, covering almost every phase of vocational and general education. In industrial education both mechanical trade work and related technical and academic courses are taught. The schools operated under the Federal Vocational Education Act limit their enrollment to those over sixteen years of age who are employed in some industrial occupation, and the courses offered are supplementary to the daily occupations of the students. There are also many other students attending evening classes in endowed trade schools, in schools maintained by industrial corporations, in classes conducted by philanthropic organizations, and in schools conducted by city systems not conforming to the Federal Vocational Law. It is impossible to secure accurate figures showing the exact number enrolled in all types of evening classes in industrial education throughout the United States, but that the number is very large is evident, and the tendency seems to be toward a considerable increase in the years ahead. The industrial evening school is peculiarly sensitive to economic changes, and enrollments tend to fluctuate sharply with the rise and fall in employment numbers, the enrollment rising during periods of extensive employment and falling during those of much unemployment.

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[1] Seybolt, Robert F., *The Evening School in Colonial America*, p. 10.

[2] *Ibid.*

[3] *Ibid.*

Character of the Problem. The conditions affecting the work of the evening school differ at nearly every point from those governing the organization and procedure of the full-time day school. Classes usually meet after the end of the working day; the work of any one session must be completed within two or three hours; the students are usually adults who are tired from a day's work but are earnestly seeking some specific bit of knowledge or skill; the teacher has to have unusual qualifications and must meet a unique situation; the course of study has to be perfectly flexible, both as to the daily and the yearly programs of the school; and the holding power of the school depends *wholly* upon its ability to meet specific individual needs. These and other characteristics of the evening school make it a unique educational agency. The success of its work is conditioned by the extent to which the factors here enumerated are dealt with properly.

To overlook the fact that the students assembling for the evening's work have already done a day's work and are unwilling to be imposed on by a poorly qualified teacher who ignores the specific ends they have in coming is to kill the school in a very short time. Men and women who do not have definite purposes for attendance obviously will not attend a school after working all day. Not only is it true that adults after working all day will not tolerate poor teaching from evening school instructors, but the teacher must use effective methods to stimulate their interest and to hold them to a continuous program of endeavor. The most important element in such teaching is the constant realization on the part of the student that he is obtaining precisely the information or skill he needs and desires. To accomplish this result the teacher must know exactly what knowledge and help the student desires to obtain and he must give him the desired aid without undue delay. When a student asks to be taught to read the blueprints encountered in his particular trade, to insist on his taking a course in mechanical drawing or to require him to struggle through lessons of the reading of drawings belonging to some trade other than his own is to lose him from the class within two or three evenings. This situation should make the evening school particularly attractive to the industrial teacher who understands the point of view of the ambitious worker. The earnestness, the singleness of purpose, and the consciousness of need on the part of the students make purposeful teaching, designed to meet specific individual needs, quite easy and very effective. It is only when the school forgets that it is dealing with wage earners—responsible adults who know what they want—that failure overtakes the evening-school program. The too prevalent tendency to regard the evening school as merely a brief edition of the full-time day school and to carry over into it the same materials and methods, with only slight modifications, is responsible for many failures. Where the unique character of this phase of industrial education is fully understood, remarkably effective results are obtained.

The Evening-school Student. The students of the evening industrial school vary greatly in age range, trade status, educational background, and purposes. In some schools all or most of the students are apprentices sent by their unions to obtain needed instruction in the mathematics, drawing, and other subject materials related to their trade practices. In other instances they are chiefly mechanics of varying ages and numbers of years of trade experience who are desirous of improving their skills and knowledge or of learning phases of their trade in which they are deficient and for which there is a demand in the labor market.

Others attend for other reasons. These variations in need and purpose present an interesting problem of administration and teaching techniques. For the most part the students are an ambitious, earnest, purposeful group, and as Greenwood pointed out in his study of evening high-school students in Philadelphia, "On the whole, there is little evidence of retardation."[4] Where the student body does not consist wholly of apprentices, the ages vary greatly, in some cases from sixteen to sixty years of age. A common characteristic is impatience with delay in obtaining the instruction they desire and with poor teaching. Because of the effort required to attend classes after working all day and the many temptations to spend the evenings in some form of recreation, they are easily persuaded to drop out of school unless they are continually conscious of receiving the instruction for which they feel a need and of making progress in their learning. This presents a real challenge to the instructor and makes imperative a flexible program of courses, the organization of instructional materials in short units, and a procedure that provides a maximum of individual instruction. It also suggests the unwisdom of insistence upon prerequisites unless they are absolutely necessary for any progress in the courses requested.

Another important characteristic of the evening-school student is that he has the adult point of view rather than that of the high-school boy or girl. It is sometimes difficult for the teacher to realize that merely because the student is in need of a grade-school subject, such as arithmetic, that he is not a grade-school pupil but an adult with an adult's attitudes and purposes and must, therefore, be treated as another adult and not as a child. The high-school teacher who also teaches in the evening school is most in danger of making a mistake in this respect. It is also true that the adult student, having a limited educational background, is much more inhibited than the high-school boy or girl and, therefore, more resentful of any discourtesy or tactlessness on the part of the teacher. He is often afraid of the ridicule of his fellow students and is more hesitant than younger students to attempt unfamiliar activities in the presence of other students.

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[4] Greenwood, Walter B., *A Study of Persistence of Public Evening High School Students.*

Some are not at all timid in the expression of opinions or prejudices and seem to be so set in their ideas as to present a difficult problem to the teacher. For the most part, however, the evening industrial-school student is an earnest, sincere person, anxious to learn as rapidly as possible, and is appreciative of good teaching and all efforts of the instructor to help him with his difficulties.

Student Needs. The individual needs of evening-school students are numerous and varied but, on the whole, simple and easily supplied. The problem they present is chiefly one of course organization. It is a problem of meeting a large number of simple needs. One student in related mathematics may have an outstanding difficulty, namely, the use of decimal fractions. As soon as he is able to handle successfully his trade problems involving decimals, his need is met. In the same class another worker may have great difficulty with the multiplication of common fractions, while a third may be weak in the fundamental processes of addition, subtraction, and division. In a shop group a man may need to know the operation of a single machine. Another may need to know how to operate three machines. Thus, the variations in needs appear, and to try to classify them on the broad bases used in the organization of the full-time school will result in much waste of time and in great discouragement. The first case mentioned above does not call for a semester's course in arithmetic; it merely requires a brief course in decimal fractions. The teacher of mathematics who is thoroughly imbued with the philosophy of mental training and of the liberalizing effects of book study finds it difficult simply and directly to teach him decimal fractions as they are known and used in a workshop. Yet the latter may be the only felt need to be met, and to attempt more than that is to lose the student. The adult trade student usually does not ask for a course in arithmetic for the purpose of acquiring an education but simply because he feels a need for an adequate knowledge of arithmetic in his daily work. The needs of the evening school students are specific, are known to the students, and are frankly utilitarian. The great need of evening-school teachers and administrators is to recognize this fact.

Curriculum Problems. The problem of organizing a curriculum for an evening school is the problem of discovering and meeting the specific needs of the students. There are two prime requisites, as revealed by experience, namely, (1) short units of instruction and (2) flexibility of course plan. The evening school must base its units of instruction on trade analysis and not on the number of weeks or months in a school year. For example, the problem is not that of planning a one- or a two-semester course in carpentry but is that of discovering the most desirable form of division into short instructional units of the carpenter's trade. A two-year course for carpenters, if offered, will doubtless fail, but a course offered in stairbuilding, complete in eight to twelve weeks, will probably succeed. Another course of twelve lessons in roof framing will also probably be highly successful, as will a later course of twelve lessons in drawing for carpenters. A series of short-unit courses designed to meet specific needs of men engaged in the trades but who lack proficiency in some phase of their work is the desideratum. This series may well be arranged in a sequence which will make possible a continuous course for the very few who may have the desire to take the complete offering in a given trade. Each unit, however, must be complete and independent of the other units offered. Some schools arrange these short-unit courses in a continuous series and award a special diploma to the student completing all the units. A certificate, however, is granted at the close of each short unit. Not only should a trade be broken up into short units, but there should be great freedom allowed in regard to the sequential order in which a student who wants more than one unit takes up the courses. With the exception of a few obvious cases, such as certain related technical courses, it matters little, or not at all, whether one or another short course is taken first. It would seem evident, for example, that a student who needed (1) a course in blueprint reading for carpenters, (2) a course in mathematics for carpenters, and (3) a course in estimating for carpentry work should take the first two mentioned before attempting the third. But it is not clear that it is of any importance whether a student needing a course in roof framing, a course in stairbuilding, and a course in interior trim takes them in any particular sequence. Not only should the arrangement for the short-unit courses be flexible, but the teaching methods should allow for many adjustments within each unit. Each student in a given group will have specific needs. One will know much about the related technical material of the unit course but will be lacking in certain skills involved in the unit. Another will be more or less skilled in the elementary phases of the unit but will need training in the more difficult processes of the course. Hence, the teaching must be essentially individual, and the teacher must be quick to make adjustments of lesson schedules to individual needs. This sort of teaching can be accomplished effectively only by means of individual instruction sheets, and these sheets must be used as they are needed and not according to some fixed sequential arrangement of jobs or lesson topics. There should, of course, be a carefully worked out plan of lessons, but the plan must allow for easy adjustment to individual needs. The curriculum, then, must be carefully developed but must be perfectly flexible, both as to the arrangement of short-unit courses and as to the lesson units within the courses.

Organization and Administration. The organization of public evening classes presents a number of characteristic problems. Some of these are (1) promotion, *i.e.*, convincing both community and school board of the desirability and the feasibility of the work, (2) securing the cooperation of employers and, in certain cases, of labor organizations, (3) the attraction and selection of students, (4) the maintenance of attendance, (5) the classification of students, (6) the control of the size of classes, (7) the collection of fees, (8) the certification of students, and (9) the providing of adequate equipment. Obviously there can be no standardized methods of dealing with these problems. Each community and each school presents individual variations on all of them. However, experience seems to indicate that there are general considerations which affect all evening-school programs.

Promotion is essentially salesmanship, and the accepted methods of salesmanship are personal contacts and advertising. Personal conferences; addresses before luncheon clubs and other community, civic, and social organizations; group conferences of employers, labor leaders, and others; newspaper publicity of various sorts; and publications sent directly to citizens are some of the commonly used devices for meeting the problem of promotion. The promoter must base his appeal upon facts, and he must be both sincere and enthusiastic. When the community realizes a need and wants to meet it, the details of providing money, buildings, equipment, etc., are easily dealt with. The securing of the cooperation of employing and wage-earning groups is almost wholly a matter of personal contacts between the school heads and the groups affected. The school head who knows what he wants and has the facts to support his contention will find little difficulty in securing the needed cooperation.

The attraction and selection of students require much skill and study. Newspaper publicity, leaflets sent through the mail, encouragement of prospective students by employers and labor leaders, and personal appeal by school representatives are methods required in starting the evening-school program. After successful work for a few years the students and former students of the school will send most of the new students to the classes. The evening school that does effective work may expect much effective support from friends and students.

The selection of students presents a greater difficulty. Shall all who present themselves to the evening trade extension class be enrolled? Certainly there will occasionally appear an individual who cannot profit by the instruction he is seeking. The evening hours are too few and important to spend any of them attempting the impossible, and through interview and perhaps in some instances the use of tests, or other examinations, the wholly unfit should be rejected. Not only should this be done, but when lack of aptitude for any phase of the school work appears later, an effort should be made to direct the student to a different level or phase of his trade than the one he is attempting, or he should be advised to enter another occupation.

The maintenance of attendance is almost wholly a matter of properly organized short-unit courses well taught by masters of their subjects. So long as an evening-school student thinks that he is getting what he needs in his occupation, he is likely to attend regularly. Nothing will take the place of this realization as a means of maintaining attendance.

The classification of students requires personal interviews involving much questioning and careful explaining of the courses. An evening school known to the author enrolled a group of young draftsmen who said they wanted a course in shop mathematics. When the instructor began a lesson on shop arithmetic, they protested that they didn't need arithmetic; they wanted trigonometry. Upon investigation it was found that they really were in need of some knowledge of trigonometry, and a course to fit their needs was immediately started. Classification of evening-school students requires very careful attention to the actual needs of the individual students.

Nevertheless, proper classification, well-planned courses, well-trained teachers, etc., will all be ineffective unless there is ample opportunity for individual teaching; hence, the control of the size of classes is essential. Small classes are necessary in evening schools. Twenty students will give an instructor about all the work he can do efficiently in one evening. When a class begins to enlarge beyond that number, there is danger that individual instruction will suffer and group instruction will play too large a part in the teacher's efforts. Undue use of group instruction will soon reduce the size of the school through withdrawals of dissatisfied students.

Experience seems to show that students are disposed to regard their enrollment much more seriously when it costs them something. For this reason the practice of charging a registration fee has grown up in some of the best administered schools. The fee may be returned when the course is completed, thus serving also as an incentive to continue to the end of the work undertaken. No hardship is imposed when the fee is required since all of the students are earning money and are enrolled for the purpose of increasing their earning ability.

The awarding of certificates is also an important administrative device and contributes to the effective work of evening classes. It is desirable to issue a certificate on the completion of each short-unit course. Such a certificate should be based both on the quality of work done by the student and the regularity of attendance. When all of the short-unit courses covering a given trade are completed and a certificate earned for each, a diploma of graduation may well be awarded. The certificates for the short-unit courses and the diploma for a complete series of such courses not only offer desirable incentives for persistent work but often have economic value to the student as means of securing new jobs or promotions.

The organization problem of providing adequate equipment is rarely serious. The evening school is usually conducted in a well-equipped day-school building where all needed machinery and tools are available. For evening courses in shopwork it is almost necessary to secure the use of such a building, since the short time during which equipment is in use makes the justification of special machines and tools very difficult. Most of the work, however, is of the related technical sort and requires little or no special equipment.

Where the school authorities are genuinely interested in the promotion and maintenance of evening courses, all these problems can be met with no great difficulty. The procedures necessary for their successful solution are fairly well established by long and successful practice.

Supervision of Evening Courses. The work of the evening school is often seriously hampered by inexpert supervision. To entrust the supervision of these schools, designed to meet the needs of men and women who have very definite vocational objectives, to a man possessed of the traditional academic attitude toward all education is seriously to handicap the effectiveness of the work. Too often are the evening schools thus hindered in their usefulness. The one directing these courses not only should be fully in sympathy with the specific vocational aims of the school, but he should know, firsthand, the character of the occupational problems which the students are facing in their daily experiences in the industries. He, consequently, should be a man thoroughly trained in the practices of industrial education and should have a wide acquaintance and thorough familiarity with industrial requirements and procedures. Fully to meet the needs of employed workers in industry the supervision of the school should be assisted by the direct personal interest of the industries and the labor organizations. To this end it has been found helpful to organize advisory committees composed of employers and representatives of labor. These advisory committees, working in close cooperation with the school authorities, can be of very great service in advising the director and the teaching staff, particularly in the matter of the planning of courses. They will also be very helpful in determining time schedules, both yearly and weekly, and in deciding on equipment requirements. The success of the advisory committee depends very largely upon the initiative and good judgment shown by the head of the evening school. He will have to assume the leadership in all joint enterprises affecting the supervision of the school. The most difficult problem of supervision, however, is that of maintaining a high level of efficiency in the instructional work. This is essentially the problem of the head of the school and involves the whole range of activities commonly designated as "training in service." It will be necessary occasionally to conduct intensive short-unit teacher-training courses to build up weak places in the instructional staff. Frequent group conferences, assignments of special problem studies, and many individual conferences will also be necessary. The personal observation of instruction, the frequent examination of results, and the constant revision of courses and procedures constitute the necessary work of the supervision of evening instruction, when such instruction is kept on a high plane of efficiency.

The Evening-school Teacher. The securing of the needed type of teacher for the evening industrial courses does not generally receive the attention it deserves. It is not an uncommon practice in evening schools offering general academic subjects to make up the faculty from the older men on the day-school faculties, thus using the evening work as a means of increasing the incomes of these men. In too many cases the chief qualification of such teachers is that their salaries are inadequate to their needs. This practice constitutes one of the factors in the high mortality characteristic of such evening classes. The industrial courses are, also, in some cases, provided with teachers chosen on this basis. It is apparently difficult for school administrators to see that successful day-school teaching is not only no guarantee of effective evening-school instruction but may be, and often is, a hindrance. It is not easy for one who has been teaching children all day, quickly and easily to assume the desirable attitude for the instruction of adults. Not only is this true, but the day-school teacher of industrial work is often inadequately prepared for the character of work required of the evening-school teacher. To command the respect of adult industrial workers and to hold their interest the industrial teacher of evening classes must possess unquestionable mastery of his field. To this end long experience in the industrial occupation he represents is necessary. To secure men of this type is difficult and requires careful planning on the part of the administrative officers. It is occasionally possible to find fully qualified men among the day-trade-school faculties and occasionally in some of the technical high schools. Usually, however, the trades and industries must be looked to for evening-class teachers. It is therefore highly desirable for an evening school to have a reserve staff of skillful trade and technical teachers who can be called into service when needed and dropped from the payroll when the short-unit courses they conduct are finished. By carefully selecting men from the various local trades and industries, enlisting their interest and cooperation and enrolling them as members of such a reserve staff, the evening school can have ready at hand a group of experts to teach almost any course for which there may be a demand. These men can be called in at intervals for short-unit intensive teacher-training courses, thus ensuring not only expert trade training but a fairly high degree of teaching skill. They should, of course, be paid the regular fees for the time they spend in teacher-training classes. If the interest of the better class of mechanics is secured in the evening-school work, no great difficulty need arise in building up a trained corps of teachers who are available at almost any time during the year for evening work. Such men, successfully engaged in their respective occupations during the day, constitute the type most desirable for evening-school instructors. Some intensive practical instruction of these men in teaching methods is very valuable, but even without it they often are more desirable as evening-school teachers than most of the full-time day-school instructors. The character of students found in the evening classes makes this true. Such students usually are able to enforce fairly effective teaching. The chief factors of success are a genuine interest in the work and an expert knowledge of the trade. Prosser and Quigley have well stated this fact in saying, "Given on the one hand a group of men or women who want to know or want to do, and given on the other hand an instructor who does know and can do, the group will get what they want somehow."[5] Thus may the teacher problem of the evening school be solved. The authors quoted here describe a large school offering from fifty to seventy-five different courses and state that "it has built up a very efficient call staff of 150 to 200 men, all of whom are employed in regular occupations but who can be drawn on for instructional services whenever these are required."[6] To organize, build up, and maintain such a staff obviously requires highly efficient administration, and the teacher problem therefore is, in last analysis, chiefly a problem of intelligent, effective administration.

Trends. Because of the restriction of federally aided evening industrial classes to trade extension courses the enrollment in such classes is exceptionally responsive to employment conditions. For this reason there is great unevenness in numbers of students from year to year. Very large differences from one year to the next are not unusual, but in the main it is clear that the trend is toward an important expansion of evening-school instruction. In the past, one notable characteristic of evening classes has been the excessively large numbers who drop out during the term. This mortality rate has been due in large part to failure of administrators and teachers to adapt their practices to the peculiar needs and characteristics of evening-school students. Much progress has been made recently in correcting the errors of earlier programs, and the trend seems to be toward much more stable enrollments of classes throughout the school sessions. A related trend is the growing appreciation of the necessity for carefully studying the evening school as a unique type of instructional unit, rather than to consider it as merely a "pocket edition" of the full-time day school. The improvement in teacher-selection procedures and in the organization of instructional materials is also an indication of a tendency to improve the quality of the instruction. Perhaps the most important trend, however, is the growing practice of operating evening programs with the aid of advisory committees composed of representatives of employers and labor. This ensures a desirable correlation of the evening instruction with the learning on the job and guarantees the cooperation of labor and employers that is essential to a successful program. Most of the elements of the present industrial situation suggest a growing interest in the expansion and strengthening of the industrial evening school as a major aspect of the total program of industrial education.

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[5] Prosser, Charles A., and Thomas H. Quigley, *Vocational Education in a Democracy*, p. 325.

[6] *Ibid.*, p. 324.

Summary and Conclusions. There has developed in education an emphasis upon adult education and adult retraining. The shifting of world markets, new inventions and new industrial products, a remarkable shifting of population, and a growing popular interest in vocational training have all been factors in the present-day interest in all types of adult education. As a result of this interest the evening industrial school has experienced a considerable growth during recent years. It is not a new type of school in the United States. It was developed during the colonial period for the supplementary training of apprentices and others who worked during the day. It is, however, a unique type of school, and its successful operation depends in large measure upon a realization of this fact. It is not merely a "pocket edition" of the day school but is a different kind of school. Its function is to provide knowledge and training for youth and adults who are engaged in industrial work during the day and who desire to enlarge their knowledge of their occupations and to prepare themselves for advancement in them. It is essential that the industrial evening school be staffed by instructors who are masters of their trades, or if teachers of related technical subjects, that they are thoroughly familiar with the work their students are doing in industry. Courses must be organized in short units, and each unit should be as little dependent for its significance to the student upon what has gone before and what is to follow as possible. The successful administration of these schools is conditioned by the degree of cooperation obtained with labor and industry. Advisory committees composed of representatives from industry and labor will greatly aid the effectiveness of the administration. Flexibility of offerings and intelligent administration are essential features of success. The trend is toward a further increase in the popular interest in the industrial evening school, and students of industrial education will do well to study carefully the problems of evening-school organization and operation. Adult students usually know what they want to learn and will not continue to attend a school that fails to meet their needs promptly and effectively. Hence, only good teaching and efficient administration will enable an industrial evening school to hold its students and to continue in operation.

QUESTIONS AND ASSIGNMENTS

1. Write a brief description and evaluation of the evening school of the American Colonies.
2. Summarize the provisions of the Federal Vocational Education Act concerning industrial evening schools and state your opinion of those provisions.
3. Why is it important to organize evening-school curriculums in short-unit courses?
4. If you were planning a program of study for machinists for an industrial evening school, what units would you include?
5. What are the advantages in developing a "call staff" for an industrial evening school, and what steps would you take in developing such a staff?
6. What should be the training, characteristics, and background of experience of the administrator of an industrial evening school?
7. What evidence is there that the industrial evening school will probably continue to grow in size and popularity in the years immediately ahead?
8. What economic and industrial conditions serve to decrease the enrollments in industrial evening schools? Explain your answer.

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Chapter 12

THE "CORRESPONDENCE" OR HOME-STUDY SCHOOL

The "correspondence" or home-study scheme of instruction has for many years been one of the major phases of industrial education in the United States. As a method of providing instruction for those unable to attend resident courses it did not originate in this country, but its greatest development has occurred here. The providing of instruction by mail began at the college level and only later was introduced at the secondary-school level. As a phase of industrial education it was not important until the privately owned home-study schools that were designed to reach those of the grade-school and high-school level of education were established. The best of these schools rapidly grew into large and important educational institutions. The university correspondence divisions have likewise experienced phenomenal growth, but they have, for the most part, served a different group of students from that served by the privately owned schools. The number of privately owned schools is very large, and they range in character from mere schemes to exploit the youth of the laboring groups for purposes of profit making to a relatively few excellent schools that maintain high ethical standards. To protect the better schools and to penalize the other kind by refusing recognition the National Home Study Council was organized in 1926 with headquarters in Washington, D.C. This organization is an accrediting agency that performs the function among home-study schools that the several regional associations of colleges and secondary schools, such as the North Central Association of Colleges and Secondary Schools, perform for high schools and colleges. Since its organization, much improvement in the practices of home-study schools with respect to advertising, course selling, and instruction has resulted. For many years, severe criticism was directed toward the home-study schools because of the character of their advertising and high-pressure selling techniques. The better accredited schools are careful to refrain from the practices that still justify such criticism in far too many cases.

Service to Industrial Education. The home-study school is able to render a unique service to the industrial worker who desires to advance himself vocationally either by improving himself in his present job or by preparing himself for promotion to a better job. This is due to the almost unlimited range of instructional materials it can provide and the wholly individualized character of the instruction given, qualities that are inherent in the home-study procedure. Each student, of necessity, has to "recite" on all the material provided, and he moves at his own pace of studying and learning. In the conventional classroom an individual may be called on to recite only once during several class meetings, the frequency depending in part on the size of the class. Furthermore, the progress of movement through the instructional material provided bears little relation to the special needs of any individual in the class. Perhaps the most important advantage of home-study instruction is that it can provide the desired instruction without interfering with the student's earning of money by permitting him to hold a full-time job. Its greatest contribution to the knowledge of the industrial worker is in the area of technical knowledge and what is commonly called "related materials," that is, the mathematics, the physical and social sciences, English, blueprint reading, and other areas of knowledge related to the mechanical work in which the worker is daily engaged. The technical materials studied may go far beyond related knowledge needed in the present job and may prepare the learner for promotion to a technical job where the emphasis is upon technical knowledge rather than mechanical skill. The increasing need at all levels of industrial work for technical understanding and the growing number of technical jobs in industry serve to emphasize the importance of this aspect of home-study instruction. John S. Noffsinger, writing in 1930, pointed out that "more than 85% of the 1,500,000 correspondence students enrolled annually in the

United States pursue vocational courses, of which 60% are in the field of job improvement."[1] Where the student can put into practice in his job the skills described in the instructions sent to him, the home-study school can contribute much to the teaching of needed vocational skills; however, except in the case of the occupational skills of the draftsman, and where a home shop with adequate equipment is available, that is not its most important function. While there are serious limitations on the work of the home-study school, it possesses the great advantage of being able to reach very large numbers of students wholly without regard to geographical limitations, of being remarkably flexible in its ability to meet individual needs, and of being almost unlimited in the range of technical subjects in which it can offer instruction. An official of one of the largest and best types of home-study schools serving large numbers of industrial workers recently said, "The ability of the home-study program to reach into the remotest and most inaccessible places, to bring education to the shut-in and the handicapped, to provide opportunities where none are available—these are the functions which inspire both gratitude and respect among its beneficiaries."[2]

Character of Materials and Instruction. The instructional materials sent to students and the texts and reference books provided by the better schools are generally regarded as excellent by authorities who have examined them. Texts and reference books are written by recognized authorities in their subject fields. Noffsinger, writing in the fourteenth edition of the *Encyclopaedia Britannica,* said, "Many correspondence schools have invested as much as $100,000 in perfecting the teaching techniques, etc., of a single course." Great care is given to the preparation of written instruction so as to make possible accurate understanding by persons who are not accustomed to learning from the printed page. Such writing is unquestionably the most difficult form of English composition, and few writers are able to acquire the necessary skill. Yet as Noffsinger wrote twenty years ago, and as many competent judges readily agree today, "Some of the best vocational literature in the English language is found in these correspondence school texts." Such comments obviously do not apply to all home-study instructional materials but only to those provided by the relatively small number of top-ranking schools. These schools, by employing trained personnel, have been able to develop materials by means of careful study of student learning difficulties and through the device of supervised study. The development of programs of supervision of the study of their students is perhaps one of the most important advances in the history of these schools. The program had its beginning in a plan developed in the high school of Benton Harbor, Mich., in 1923, and often has since been referred to as the "Benton Harbor Plan." Under this plan teachers of the high school are employed to give time to supervising the study of groups of students who are provided with courses purchased by the school board to enable the school to offer a wide range of vocational instruction. These teachers help students to understand the printed instructions, and they oversee study procedures. The work of pupils is graded by the home-study school from which the courses are purchased, and the high school gives credit toward graduation for work successfully completed. The plan has been adopted by numerous communities, and a modification of the plan has been developed to aid older working students who are not enrolled in any resident school. By limiting the following comment to the few best home-study schools it may be said with confidence that the instructional materials provided are excellent and the instructional procedures are, in many respects, sound and effective.

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[1] "Correspondence Schools," *Encyclopaedia Britannica*, 14th ed., 1930.

[2] McNamee, Philip L., "Home Study: School of the Second Chance," *Dictaphone Educational Forum,* October, 1949, p. 11.

Inherent Difficulties. It has been indicated that home-study instruction enjoys several advantages over resident school instruction, but there are also several serious disadvantages inherent in such instruction that are difficult to overcome. Among these are (1) the inability, for various reasons, of many to complete a course, (2) the rather common lack of ability to read with comprehension and to learn from the printed page, and (3) the exceptional character and determination needed to pursue a course of study after a day's work.

One cause of failure to complete a course is the high-pressure salesmanship practiced by some schools. Students who are over-persuaded to purchase a course when they are not fully determined to pay the price in time, energy, money, and deprivation of accustomed recreational practices are almost certain to fail to complete even a very short course. Students who seek courses on their own initiative are the ones most likely to complete the courses purchased. A further deterrent often involved is family opposition to the time the student must give to study, when his time at home is needed, or desired, for family social life and home duties. In some cases overtime work in the vocation causes assignments to be put aside and leads to discouragement and failure. These, and other similar influences, cause many to fail to complete courses.

A second serious cause of failure, not generally understood, is the widespread inability to read with comprehension and to learn from the printed page. Studies of this problem indicate that the number of persons who seem unable to read with understanding is very large. It is a prolific cause of failure in high schools and colleges. Some educators think that many otherwise normal children are incapable of acquiring the art of reading. Whether that is true or not, it is a common disability and makes home study, without the aid of a teacher, almost impossible for many.

A third difficulty is the obvious one of the degree of self-management and determination to budget one's time, to force oneself to study when the body is tired from a day's work, or to rise early and study before the day's work begins, when there is an almost irresistible inclination to stay in bed. This self-discipline is as real a factor in success as any that may be considered and is often more important than any other, not excepting native capacity or general intelligence. This quality of character is found in relatively few, and its absence is a cause of much failure among home-study students. It is, of course, a frequent cause of failure in all human undertakings, but where there is present an overseer, such as a teacher or supervisor, who constantly urges his charges on by encouragement or warning, the person lacking this quality of self-command is much more likely to make progress. By arranging for supervision of home study much can be done toward lessening the effects of this common weakness, as well as other difficulties mentioned here.

Type of Industrial Student Benefited. The student most in need of home-study instruction in industrial subjects is the young person who for some reason left the full-time school before completing high school. He has learned that high-school graduation is increasingly a requirement even for relatively simple jobs. Often his first concern is to acquire a certificate of completion of high-school requirements. Mr. McNamee stated in 1949 with reference to the American School of Chicago, "It is significant that the high-school department is the largest single department in the American School, with over 60,000 active students, exclusive of those in the Supervised Correspondence Study Plan for local high schools."[3] It is evident, however, that the chief vocational value of a high-school certificate is to obtain employment rather than to indicate possession of the technical knowledge that is increasingly necessary for success in employment and for advancement. Hence, the ambitious young worker, early in his career in industry, begins to feel the need for more technical knowledge. Financial pressure makes attendance at full-time resident schools an impossibility for most such persons, and where well-organized evening-school classes providing a wide range of courses taught by fully competent specialists are not available, the only opportunity for the needed instruction is provided by the home-study schools. The typical student of these schools is a young man just past twenty-five years of age who did not finish high school and who has had considerable experience in the lower levels of employment. He has become aware of his deficiencies in training and knowledge and is ambitious to better his condition by removing them, as far as it is possible, while working at his job. He has discovered what he probably did not believe when he was younger, that successful work and advancement cost something in terms of intelligent and persistent effort to learn and achieve. He is, therefore, of the select group among industrial workers and worthy of the best training facilities that can be provided under the circumstances. It is to this type of worker that the home-study school can render the greatest service, and this fact makes it an important educational agency in the field of industrial education. The rapidly changing character of industry that is causing it increasingly to

[3] *Ibid.*, p. 10.

place a premium upon technical knowledge, is leading an ever-growing number of young industrial employees to seek to know more about their field of work. Modern society is increasingly intolerant of ignorance and incompetence, and American youth is coming to realize that fact, but far too many reach such realization too late to be able to meet the educational and training demands of society before entering full-time employment; and so the home-study schools become literally, as they often advertise, the "second-chance school" for such persons.

There is, however, another group of industrial workers that can be effectively served by the home-study school, namely, the experienced mechanic and the technical employee who faces the necessity of changing his job because of new technical or production developments, and the worker who must acquire quickly some newly developed technical procedures in his old job. This situation is becoming more and more common in all divisions of modern industry—in the custom and repair occupations as well as in the factory trades. In this case the intelligent, ambitious worker can, by capitalizing on his present skills and knowledge, quickly enlarge his knowledge and industrial competency to include the needed new technical materials, and for many such workers the home-study type of instruction is the most desirable. Industrial research and the invention of new devices are producing an ever-growing demand for such technical and mechanical retraining of industrial employees, and this fact presents a challenge to all types of supplementary educational agencies—the evening and part-time classes of the public schools as well as the home-study schools.

Improved Procedures. The small group of top-ranking home-study schools serving industrial workers has developed procedures that have greatly enhanced their effectiveness. One of these is the practice of offering some degree of vocational guidance to prospective students to aid them in obtaining the sort of training that will best meet their needs. Where such guidance is effective, it does much to avoid discouragement, the failure to complete courses purchased, and possible frustration in vocational life generally. Vocational guidance is extremely difficult under the most favorable conditions, and there are obvious difficulties apparent in attempting to provide it by correspondence. However, something can be accomplished by providing accurate information about vocations and the kinds of knowledge and training needed for success in them. Something can also be accomplished by aiding one to consider carefully his own purposes, willingness to pay the price of achievement, and his attitudes and abilities as revealed by his work experience. Any aid that can be given should be attempted, and any effort on the part of home-study schools in that direction is a great advance over the high-pressure salesmanship practices that have too often characterized the procedures of some schools. Another great improvement has been the breaking down of courses into short units so that students can purchase only the phases of a subject field they need and desire, without being required to buy a whole course, much of which they already know. In earlier years there was much adverse criticism of home-study schools because of their failure to offer short-unit courses. A third advance has been the provision of supervised study for many students and increased provision for trained personnel on the instructional staffs of the schools. These make possible an instructional situation that more nearly approaches the resident-school interchange of thought between student and teacher and introduces at least something of the personal element so necessary for most learners in the teaching-and-learning situation. Another advance in the practices of the best schools is the organization of research divisions to study objectively the problems of home-study instruction. This last forward step may in time prove to be the most valuable advance made by these schools since they began their services as a greatly needed supplementary agency in a democratic scheme of education.

Summary and Conclusions. The home-study school has become an important factor in providing opportunity for industrial education in the United States. The better schools of this type have made great progress in the quality of their offerings during recent years, and they have done much to overcome the causes of earlier criticisms directed toward home-study schools. By means of the accrediting of schools by the National Home Study Council, which was organized in 1926, the ethical standards of these schools have been raised, and a general improvement in the type of advertising and in the methods of recruiting students has resulted. The home-study school serves many students who cannot, for various reasons, take advantage of the facilities offered by existing public-school industrial-education programs. Its greatest contribution to industrial education is the technical instruction it gives to the ambitious young person who has to work at a full-time job and who has come to the realization that his failure or inability to finish his school training when he was younger is proving a hindrance to advancement. There are thousands of such persons, and they are important men and women in the economic and social fabric of the nation. Home study is the only possible means of reaching many thousands of persons who want to know more in order to achieve more. As an agency for providing industrial education the home-study school is of increasing importance in the modern scheme of social and economic life. Its problems, methods, and function in the total program of education should be of great interest to all students of education and particularly to students of industrial education.

QUESTIONS AND ASSIGNMENTS

1. Why, in your opinion, has the service rendered by the home-study school been almost wholly neglected by the public school?
2. List in parallel columns the advantages and disadvantages of the home-study type of instruction.
3. Write a brief description of the Benton Harbor Plan, and indicate the advantages and disadvantages of this plan as a means of providing instruction in industrial education.
4. As a means of providing industrial education, what groups of persons can best be helped by the home-study school? Be specific.
5. What are the most serious difficulties encountered in the home-study type of instruction?
6. How do you account for the very large number of persons who purchase home-study courses?

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Chapter 13

INDUSTRIAL ARTS IN SECONDARY EDUCATION

Beginnings in the United States. Industrial arts was introduced into the high school as "manual training" with the opening of the St. Louis Manual Training School in 1880. Calvin M. Woodward of Washington University established that school to meet a need for training boys to understand the processes of industry and to acquire the ability to use their hands in doing useful work with the tools and machines most characteristic of the major industries found in their environment. In the beginning of the manual-training movement in secondary education there were two major purposes in the thinking of the founder in the United States, one to enrich the general education of the schools and make it more responsive to existing life conditions, and the other to provide a type of school training that prepared youth to learn more quickly and effectively the skills and technical knowledge needed by skilled workers in a rapidly expanding industry. The prevailing prejudices of educators with reference to any sort of specific vocational training in the public schools, very early in the history of the movement, caused Woodward and its other advocates to avoid reference to the vocational-training purposes and values of manual training and to place the emphasis upon its importance as a needed phase of general or cultural education. Woodward's plea, often stated, was, "Put the whole boy to school, his hands as well as his head." It was this emphasis that gave significance to the name "*manual* training." However, an examination of the discussions among educators of that day reveals that the advocates of this new type of schoolwork stressed its intellectual values while its enemies fought it as vocational training which, in their thinking, had no place in the common schools.

Effects of Early Controversies. The controversies between the advocates and opponents of manual training did much to clarify the thinking of educational leaders during the last twenty years of the nineteenth century and, of course, served to create much popular interest in the subject. The controversy did not occur in an educational vacuum. The schools were fully ready for reform. There was much agitation for making education less remote from the life of the times, more democratic, and more practical. The gap between the obvious educational needs of youth and the knowledge and training provided by the school curriculum was so great that the demand for reform was urgent and almost irresistible. The manual-training movement seemed to many the solution of the problem of making the schools meet the educational needs of the new day in the life of the nation. As a result of the popular and professional interest in educational reform and of the great need for skilled workers in the rapidly expanding industries, manual training spread with remarkable rapidity among the high schools of the nation. Following the pattern of the St. Louis Manual Training School, there arose, first, similar privately supported schools and, soon after, public manual-training high schools. The most important development, however, was the gradual acceptance of manual training as an important phase of the standard high-school program. During the last decade of the nineteenth century this work began to spread into the upper grades of the elementary school.

The Vocational Movement. The manual-training movement was modified from time to time by influences from other movements of the era. Two important influences were the sloyd movement, imported from Sweden, and the arts-and-crafts movement, from England. These both served to enrich the aesthetic features of the work and to emphasize the importance of pupil interest in the activities provided in the school shops. However, the most significant change in the character of manual training resulted from the vocational-education movement that began to be effective during the first decade of the twentieth century. This movement, that set as its goal Federal aid to vocational education of less than college grade, reached that goal in 1917. In the effort to win popular support for vocational-industrial education, some of the leaders of the movement thought it necessary first to destroy manual training, since many taxpayers persisted in regarding it as vocational education. Many manual-training teachers and leaders were also far from clear as to the function of their subject, and their reaction to the attacks by the leaders of the new movement was to insist that manual training is valuable vocational-industrial education. Manual-training teachers and leaders not only replied vigorously to the attacks in words, but they became active in trying to make their work more vocational in character. In this effort much enrichment of the technical content of courses resulted, modern equipment was installed, and factory procedures were studied and introduced into the shops. More attention was given to imparting information about modern industry, its processes, problems, and importance in the national life. As a result of these activities it soon became evident that manual training had become more genuinely educative and a much more valuable phase of general education. This enrichment of content, together with the broadening of the program to include the junior high school and the grades, suggested the more appropriate name of "industrial arts," that is, the study of the arts of industry as an important phase of the general education of everyone, regardless of his future vocation. Meanwhile the vocational-education movement developed entirely outside the manual-training movement. It unwittingly served greatly to stimulate the further development and enrichment of the older movement. Gradually the earlier antagonisms died out until there has come to be a general recognition of the distinctive functions and the important relationship of the two phases of the larger area known as "industrial education." Today, industrial arts as the general-education phase of industrial education, and vocational-industrial education as the vocational phase, are working together as never before to meet the industrial-education needs of American youth, not only those who will work in industry but also those who will not, but will as intelligent citizens need the knowledge and training to be obtained from the experiences of the school shops and drawing rooms.

Functions and Aims. From the beginning of the manual-training movement to the present day many have tried to express in formal statements the aims and values of this phase of school work. Professor Selvidge often pointed out "Subjects don't have aims, only teachers have aims"; but the teacher's aims must be related to the functions and desirable outcomes of the subject of study involved. At the present time the aims most generally agreed upon by leaders and teachers of industrial arts are those listed in the bulletin of the American Vocational Association called *Improving Instruction in Industrial Arts*. Many would add other aims, others would eliminate some and revise several. No formal statement of aims has ever fully satisfied all concerned; this list of aims, however, has probably exerted more influence in clarifying the educational purposes of those responsible for industrial-arts instruction than any other of recent years. It is as follows:

"1. Interest in Industry. To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange.

"2. Appreciation and Use. To develop in each pupil the appreciation of good design and workmanship, and the ability to select, care for, and use industrial products wisely.

"3. Self-discipline and Initiative. To develop in each pupil the habits of self-discipline and resourcefulness in meeting practical situations.

"4. Cooperative Attitudes. To develop in each pupil a readiness to assist others and to join happily in group undertakings.

"5. Health and Safety. To develop in each pupil desirable attitudes and practices with respect to health and safety.

"6. Interest in Achievement. To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure-time interests.

"7. Orderly Performance. To develop in each pupil the habit of orderly, complete and efficient performance of any task.

"8. Drawing and Design. To develop in each pupil an understanding of drawings, and the ability to express ideas by means of drawing.

"9. Shop Skills and Knowledge. To develop in each pupil a measure of skill in the use of common tools and machines, and an understanding of the problems involved in common types of construction and repair."

Many modern educators doubtless would add to the list the aim of affording an opportunity to exercise and develop the latent creative powers of youth. In any case it is obvious that these are all essentially functions of general education. They are the functions of general education that the industrial-arts experience are peculiarly fitted to serve. Other phases of general education can also serve these purposes but few, if any, as appropriately and effectively as can the industrial-arts experiences.

Place in the Curriculum.[1] Industrial arts is the recognized representative of industry in the school curriculum in the same sense that such subjects as physics, chemistry, and biology represent the world of science in the schools. The curriculum of the modern school increasingly reflects all the significant aspects of modern life, and since industry is one of the most ubiquitous and obtrusive features of modern life, it must of necessity be adequately represented if the school experiences are to enable children and youth to become constructively adjusted to modern life. It is important that the representation shall be an accurate reflection of industry as it exists in the modern world rather than a reproduction, at the school level, of the handicraft form of industry of the eighteenth century. There is some justification for the craft type of industrial work in the elementary school for purely pedagogical reasons, having to do with certain forms of art expression, the release and directing of creative urges, and the training of eye and hand of young children. In addition, the historic significance of earlier human practices in the production of useful objects which contributed to the development of modern civilization further justifies certain craft activities in the grades. In the high school, however, which deals with youth who are soon to take their places as consumers and producers in the modern world, modern production procedures and modern industrial materials should predominate in the course content of industrial arts. This concept should guide not only the choice of procedures, materials, and projects, but the class organization also should simulate, as far as practicable, the organization of the personnel as practiced in modern industry. The educative, or disciplinary, values of industrial-arts instruction are definitely enhanced by so managing instructional procedures. For example, in some of the best city departments of industrial arts, the instructor plays the role of factory department superintendent and the class is organized as a production group with functional foremen, such as production foreman, safety supervisor, toolroom clerk, personnel foreman, maintenance foreman, etc. The instructor gives instruction but deals with the pupil foreman in supervising the several organizational functions of the group. The testimony of those who have persistently maintained such a procedure over a period of years indicates that this feature becomes one of the most valuable educative features of the course.

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[1] The remainder of this chapter is based upon the article "Needed Emphasis in Industrial Arts" by the author in *Industrial Arts and Vocational Education Magazine*, Vol. 35, No. 7, September, 1946. By special permission of The Bruce Publishing Company.

Obviously such an organization of the class also enables the pupils to acquire, through their activities, an understanding of the organization and general production procedures of modern industry. This understanding is enhanced if at least some of the projects undertaken are worked out as group projects using the necessary division of labor characteristic of quantity-production methods. This sort of class organization can, of course, be carried to an unwarranted extreme, but it is presented here as an illustration of a typical attempt to make the work of the industrial-arts department a true representation of modern production practices.

Scientific Knowledge Involved. One of the most significant features of modern industry is the increasing extent to which scientific knowledge is applied in production. Hence, it is important that the scientific principles involved in the construction methods used in the shop and the scientific knowledge related to the nature and preparation of materials used shall be understood by the pupils. The educative possibilities of the industrial-arts experiences are greatly diminished when the emphasis is placed wholly upon making things rather than giving due emphasis to what is learned through the making of useful and beautiful objects. There is a rich background of instructional material having to do with the physical and social sciences involved in all project work in the school shop, and the educative values inherent in grasping this relationship between the mechanical and related informational features of the work should be fully exploited.

Moral Values. There are important moral values to be derived from well-taught shop and mechanical-drawing courses. There are few phases of schoolwork where the moral elements latent in the organized activities of pupils can be more easily seen by them and capitalized by the teacher in the interest of the pupils. These moral elements have to do with habits, attitudes, and ideals which may be developed through the work of the shop and drafting room. The very essence of good shop teaching is the requirement of planning in complete detail every undertaking from design, selection of materials, and operations to be performed to the completely finished product. This involves developing the habit of analyzing and planning every job undertaken and always persisting to the end when once a project is begun. The good teacher never permits an exception in this procedure, and he can easily make the pupil conscious of the importance of analyzing, planning, and following through whenever he undertakes any worthy enterprise.

Honesty in Work. Again, the development of the ideal of honesty in work is relatively easy in school shop instruction because the consequences of dishonesty and the necessity of perfect honesty are rendered obvious by the very nature of shopwork. For instance, if a piece of material in a project is to be exactly 10⅞ inches square, it must be exactly square and precisely 10⅞ inches in both directions, or it will not fit; and there is no effective way to conceal an error. If the teacher takes full advantage of this fact in every case, allowing no concessions with reference to such matters, the pupil can easily generalize from his experience with a little help from a teacher whom he respects. This quality of shopwork is especially obvious in group projects where group opinion serves to enforce the necessity of honesty in work. Much depends, of course, upon the moral standards of the shop teacher. A careless teacher with low standards of achievement may encourage dishonesty, but it is clear that the inherent character of the industrial-arts experience offers every opportunity to promote the ideal of honesty in work.

Social Values. There is also an exceptional opportunity in shop instruction to promote social cooperation and generosity in contributing to the common good. This may easily be made apparent in the organization of the shop class and in the obvious necessity of avoiding practices which interfere with the successful work of fellow pupils. It is particularly easy to see in group projects to which each member of the class contributes his assigned task. Pupils have little difficulty in observing that the failure of anyone to do his part at the right time and in the proper manner will injure the result of the work of all the others and that all are equally responsible for the outcome of the undertaking. Here, again, the ideals and intelligence of the teacher constitute a major factor in achieving the desirable moral growth which the situation so clearly suggests.

Self-management. Self-discipline as a desirable result of the shop experience is another outcome which the careful teacher may easily make clear. The very accuracy of the manipulative processes, required to accomplish desired results, suggests the importance of self-management. This easily becomes apparent not only in tool processes but in mathematical calculations and in the application of technical knowledge involved in the selection and handling of various materials. Impatience, fits of temper, lack of concentrated attention all produce disastrous results almost immediately in construction activities, and pupils have little difficulty in seeing what happens when self-control is not constantly exercised. Once more the requisite generalization for the development of the ideal rests, in part, upon the alertness and tact of the teacher who must be ever watchful for a suitable opportunity to drive home a moral concept which may be derived from the pupil's experience.

Skill and Technical Knowledge. There is at least one more feature of industrial-arts instruction that is of major importance in modern education, namely, the development of skill and technical knowledge which not only enable the pupil to test his own powers and interests but prepare him to engage successfully, if he so desires, in vocational-industrial education later. The guidance values of industrial arts are greatly limited in range, and they are often overemphasized by educators, but they are great in at least two directions; first, in deciding whether or not one desires to engage in a mechanical occupation, and, second, if so, in what kind of mechanical occupation. This fact suggests the importance of pouring into the shop courses much interesting and accurate occupational information relating to the various mechanical and industrial vocations. Such information can most effectually be provided through factory and construction-job visitation, motion pictures, class talks, and written reports of investigations by the pupils. This phase of shop instruction is one of the features of the best school shop instruction of the modern school and is one of the reasons for changing the name of the nonvocational shop instruction from manual, or hand, training to industrial arts.

Relation to Vocational Education. The use of industrial arts as basic training for later vocational-industrial education is of increasing importance. Boys who have been well taught in the industrial-arts shops and who decide to become skilled mechanics or machine operators in industry have little difficulty in mastering trade skills and often are much better informed concerning the reasons for the procedures followed and the technical knowledge needed for promotion than are those trained merely by apprentice practices. This value of industrial arts depends upon the standards of achievement maintained by the instructor, his own skill and knowledge, and the emphasis he places upon efficient procedures to be followed by his pupils. Increasingly school authorities are asking for industrial-arts teachers who have had some experience in industry in addition to thorough college training in industrial education. Such teachers are usually more likely to maintain high standards of craftsmanship and to teach modern production methods of work.

Summary and Conclusions. The objectives, values, and trends mentioned here may be summarized as follows in terms of what should be stressed:

1. There must be more emphasis upon skill, both in manual and machine processes taught. Some extremists in the progressive education movement have discounted the value of skill, and much of the educative and prevocational values of industrial arts have thereby been lost. There must be a return

to Dr. Woodward's emphasis upon skill and knowledge of tools.

2. More scientific and technical knowledge must be imparted in connection with the shop instruction. Almost every element in the present industrial situation indicates the necessity for this development.
3. The growing complexity of industrial processes and of economic and vocational life make urgent an increasing emphasis upon the development of the habit of analytical, constructive thinking. This is largely a matter of method of teaching and instructional skill. It involves the whole range of educational techniques concerned with self-discipline, thoroughness, and desire for perfection. Only teachers who themselves possess this attitude can successfully aid pupils to develop it.
4. More attention must be given in course offerings to new materials, new procedures, and new applications of the sciences to the daily work of the world. This will mean constant study by shop teachers and frequent contacts with new industries.
5. Shop equipment, arrangement, and organization must be a more accurate representation of modern industry. Pupils must be made aware of the similarities of their procedures, tools, machines, and class organization to the procedures of modern factories and industrial practices.
6. Industrial arts must be assigned a larger place in the time schedules of the school. Much more time per week must be devoted to experiences in shop and drawing room than is now provided in most schools.
7. Industrial arts must be made available to hundreds of thousands of children and youth who are now denied the opportunity for such experiences. This will mean (*a*) a vigorous campaign to extend offerings to small schools in villages and rural areas which have no offerings at the present time and (*b*) greatly enlarged departments in many schools now offering one or two courses.
8. A closer relationship between the offerings of industrial-arts courses and those of vocational-industrial education is needed.

This will be to the advantage of both divisions of industrial education.

9. Greater attention should be given to forms of industrial-arts appropriate for the elementary grades as a required feature of the elementary education of every child.
10. Finally, more outstanding boys and young men must be urged to prepare for industrial-arts teaching as a lifework. Few vocations offer a more promising career, and shop teachers should use every legitimate means to recruit for their profession the brightest and best of their pupils. The future of industrial arts depends upon the caliber of those engaged in it professionally and upon the leadership developed among them.

QUESTIONS AND ASSIGNMENTS

1. How do you account for the rapidity with which manual training was accepted by the leaders of secondary education after 1880?
2. What were the most effective arguments used by the early advocates of the introduction of manual training into the high-school curriculum?
3. Sketch the history of the sloyd movement and indicate its effects upon the manual-training movement.
4. What effect did the arts and crafts movement have upon manual training in the United States?
5. What changes, if any, would you make in the statements of objectives in the American Vocational Association bulletin *Improving Instruction in Industrial Arts*?
6. What do you regard as the chief strengths and weaknesses in modern industrial-arts courses and methods of teaching?
7. What can industrial-arts teachers do to lead the brightest and ablest high-school seniors to become industrial-arts teachers?

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Chapter 14

VOCATIONAL-TECHNICAL TRAINING

Training Technical and Supervisory Workers. One of the most neglected areas of vocational-industrial education has been the area concerned with those phases of industry that require technical knowledge of less than professional or engineering grade but more than that of the skilled mechanic. During recent years there has been a steadily growing demand for workers trained to function in this phase of industry. The training of such workers has come to be called "vocational-technical training," and with the increase of technology in production, numerous efforts are being made to meet the demand. To the present there has been a confusing diversity of procedures and agencies employed in training technical workers. Perhaps the most popular name for an institution designed exclusively for the preparation of those desiring subprofessional technical jobs is "technical institute," but this name is not universally employed, and numerous other agencies are attempting to provide the needed training as a part of other broader educational or training functions. University extension divisions, both public and private junior colleges, training departments in industry, the Y.M.C.A., home-study schools, trade associations, engineering colleges, and evening and part-time city-school vocational-education departments are all involved in efforts to meet the training needs of technical workers. Because of the great variation in needs from industry to industry, both with respect to the numbers of such workers required and the amount and kind of technical training necessary, it is not probable that in the near future any standardized type of training will be either possible or desirable.

Character of Training Provided. Some technical jobs require considerable preemployment training, while others call for short, intensive part-time training given during employment, and there are numerous gradations between these extremes. The United States Office of Education study published under the title *Vocational-Technical Training for Industrial Occupations* classified the many technical occupations under four categories as follows: "(1) Engineering aids and science aids, such as drafting specialists and laboratory assistants, requiring a year or two of pre-employment training. (2) Technical specialists or limited technicians, such as certain types of inspectors, who can be trained in relatively short pre-employment courses. (3) Technical production and maintenance supervisors, who must have a background of industrial or trade experience, plus supplementary technical and supervisory training and (4) Semi-technical men, such as technical salesmen or factory accountants, who need technical training in addition to that of some other type." In a study of twenty-two industries, this report further listed the technical-job groups that appeared most frequently in the study, though it stated that "several hundred payroll occupations, considered to be of vocational-technical type, were reported in the surveys . . . ." The list is important as a means of making clear what sort of jobs are thought of as vocational-technical occupations and is as follows:

Analysts
Computers
Designers
Dispatchers
Draftsmen
Engineering aids
Estimators
Foremen
Inspectors
Laboratory technicians
Liaison men
Maintenance technicians
Methods men
Operators of technical equipment
Planners
Process specialists
Production control men
Special equipment technicians
Specification writers
Superintendents
Supervisors
Technical assistants
Technical clerks
Technical illustrators
Technical salesmen
Technical writers
Testers[1]

The study found that industry needs from two technical workers to one engineer in some fields, to twenty such workers to one engineer in others, the average ratio being five and one-half to one. This variation in the ratio of the number of needed technicians to one engineer indicates in striking manner the complexity of the problem and the probable reason for the large number of different types of agencies that are attempting to meet the need. It also suggests the necessity for flexibility of training programs and continuous study of the changing requirements in the various industries employing technical workers.

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[1] Federal Security Agency, U.S. Office of Education, *Vocational Technical Training for Industrial Occupations*, Vocational Division Bulletin No. 228, 1944, p. XI.

Whose Responsibility Is It? The wide diversity of training needs and the numerous agencies attempting to meet the need have created much divergence of opinions as to whose responsibility it is to provide the necessary vocational preparation of technical workers. Certain leaders in engineering education have contended that it is clearly an engineering-college responsibility and can best be met by sending members of the engineering faculty to various training centers scattered throughout the state in which the college is located, to offer needed courses of instruction. Some leaders in the field of plant training from the large industrial corporations insist the responsibility is obviously that of the training departments of industry. Leaders in the field of public-school vocational education are equally sure that it should be a phase of the vocational-education program of the public schools. Many general educators insist that the need can best be met by developing special terminal courses in the public junior colleges. All these claims deserve careful study, and it is probable that all the several types of institutions will be needed to meet the varying requirements for the training of the many different levels and kinds of technical workers. In an earlier era it was thought that the technical high school was specially qualified to supply this educational need of youth, but during recent years there has developed a strong trend toward making vocational-technical education a post-high-school problem. A further complicating factor in the problem is the fact that it is not wholly a preemployment type of instruction but frequently involves upgrading and retraining of employed persons who are under the necessity of continuing their employment while acquiring technical training. It is also true that not a few technical jobs require as part of the preparation a long experience as a skilled worker in industry. Thus it seems clear that no single type of agency is likely to be able to meet all the training needs of technical workers in industry.

Character of the Training Needed. Where specially designed institutions are developed for the training of technical workers, it is interesting to observe some of the old educational pressures and trends operating to weaken the specific purposes of vocational-technical education. Among these is the pressure to be accredited. Leo Smith, in the "Annual Survey of Technical Institutes," for 1948, wrote, "That there is a continuing pressure on the technical institutes for accreditation and academic respectability is indicated by the fact that all the state maritime academies have arranged their three-year, full-time programs so as to be eligible to grant degrees. Likewise, two of the technical institutes have reorganized as junior colleges and now are members of the American Association of Junior Colleges."[2] This same kind of pressure and tendency was largely responsible for changing nearly all the early polytechnic institutes into engineering colleges, and it is producing similar results in the case of junior colleges, which were designed to be terminal institutions but which have become merely the freshman and sophomore years of the senior-college program and, in some cases, even four-year senior colleges. It is of the greatest importance that the industrial vocational-technical school, of whatever name, shall maintain its character as a terminal vocational school designed to meet the needs of the technical worker of the subengineering level of industrial service. The U.S. Office of Education report, quoted above, said of vocational-technical training, "It is vocational in objective and technical in content; and, as the term *training* connotes, it is directed at practice to gain skill—skill in the application of technical knowledge to productive work." And it further defines the purpose of such training thus: "*Vocational-technical training is designed to prepare persons for, or to upgrade them in, technical occupations for which engineering school graduation is not required.*"[3] The efforts of some educators to dilute the curriculums of these schools with academic or general education courses not required by the purposes of the schools have in some instances been a retarding influence in the development of this much-needed type of training. As the vocational-technical school increasingly becomes a post-high-school institution, there is little justification for the contention of those who would enlarge the program to include more general education than is necessary to acquire the needed technical training. It is sometimes overlooked that in most cases the amount and character of the training is such as to call forth the best intellectual efforts of the student. Courses dealing with metallurgy applied to welding and heat-treatment of metals, estimating for building contractors, production planning for machine manufacture, and other areas of technical knowledge, and skill of comparable grade require intellectual efforts of a high type. In some cases attention has to be given to a study of selected areas of the basic physical sciences, but in all cases it is imperative that the specific vocational purpose of the course or curriculum be strictly adhered to and the terminal character of the instruction be kept clearly in mind. To fail to do this will inevitably result in a less effective training for the jobs sought by the graduates of these schools or training programs.

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[2] Smith, Leo F., "Annual Survey of Technical Institutes," *Technical Education News*, Vol. III, No. 4, May, 1948, p. 4.

[3] Federal Security Agency, *op. cit.*, p. 1.

The Teacher. The diversity of training requirements has made the definition of teacher qualifications an extremely difficult matter. Perhaps the only common qualification of the numerous types of teachers needed is a thorough knowledge of working conditions and demands of modern industrial production. In most cases this means several years of industrial-employee experience. In all cases such background of experience is a definite asset and ensures a degree of teaching competence that can be obtained in no other manner. In addition the teacher must be thoroughly trained in the basic technical knowledge he attempts to teach and in modern methods of its application to production procedures. It is also essential for such teachers to know how to teach and to possess skill in teaching. This quality is one that the teacher taken immediately from production without any professional training is most likely to lack, and it constitutes the greatest weakness in the program of vocational-technical education. Few instructors from engineering colleges and fewer still in the factory-training departments have such training. Teacher-training agencies have given far too little attention to the problem of developing training courses for vocational-technical teachers. It is possible that for a good many years to come the best contribution toward meeting this need by teacher-training agencies will be the providing of programs of training in service by itinerant teacher-trainers and by offering short-unit, intensive courses for the employed technical teachers. Another important phase of the problem is the careful selection of such teachers. Important qualifications to look for when selecting teachers are intelligence, personality, a desire to be a good teacher, effective use of English, and thorough knowledge of the technical materials with which they deal. It is obvious that the success of any program of vocational-technical training depends chiefly upon the quality of the technical teachers involved in the program.

The Students. It is quite clear that the desire to enjoy the prestige and pay of the technical worker is not a sufficient qualification for the selection of one to be trained for a technical job. Only those who have the necessary background of general education and the capacity for acquiring the skills and knowledge requisite for success should be admitted to training programs. There can be no standard requirement for such students because of the varying types of technical jobs, but directors of these training programs should establish special entrance standards for each type of job. This can be done by careful analysis of the skills, facts, attitudes, and personal traits required by each job in the various industrial fields. As in all other phases of vocational-industrial education, effective vocational guidance and pupil selection are greatly needed. School grades, intelligence, and aptitude tests are useful both in guidance and selection, but a study of personality traits, character, and ambitions are of greater importance. Experienced vocational counselors and personnel specialists can add much to the success of training programs. The teaching problem is essentially that of adult education. Most technical-education students are young adults, and there are wide variations in the amount of previous schooling. For the most part they are young men, since less than 4 per cent of the total day students in technical institutes are women. The needs and character of these students indicate clearly the necessity for direct, clear, individual instruction. The traditional academic approach to the teaching of technical knowledge will not often meet the needs of these students. The extent to which this is true varies with the field of technical training involved, but most technical workers are required to possess skill in the application of technical knowledge rather than intellectual skill in the manipulation of technical data and concepts. Their work is less creative and more repetitive than that of engineers but requires more knowledge of scientific principles than that of the skilled mechanic.

Trends. Industry, labor, and the general public are becoming increasingly interested in the development of vocational-technical training. The interest of young persons is indicated by the numbers that are willing to pay large tuition fees to private technical schools operated for profit making. The Office of Education report, referred to earlier, stated in 1944 that "reliable information shows that many millions of dollars have been paid in tuition fees to private vocational schools during the past five years."[4] Leo Smith's "Annual Survey of Technical Institutes" for 1948 showed that "enrollments in technical institutes continued at a high level . . . ." When the large number of industrial workers who are enrolled in Y.M.C.A. classes, home-study schools, and training courses given in plant schools for the training or upgrading of technical and supervisory workers is considered, it is evident that this phase of industrial education has become of major significance. The oversupply of engineering graduates during the years immediately following the close of the Second World War caused many who possessed engineering training to enter this type of work. It is becoming increasingly evident, however, that the technical jobs of industry are best filled by persons who are specially trained for those jobs. It seems clear that in the years immediately ahead there will be a growing demand for the type of industrial education known as "vocation-technical training."

Summary and Conclusions. As industrial production continues to be increasingly technical in character as a result of scientific research and new operational techniques, the need for the special training of technicians constantly grows. For many years there has been a recognition of the need, but only in recent years has careful attention been directed toward organized efforts to meet the need. It has become clear that the jobs in industry below the engineering level but above the skilled-mechanic level are not only of increasing importance but that they are of a specialized character requiring a specialized type of training. At present there are numerous agencies attempting to prepare young persons for vocational-technical jobs. The wide variety of types of such jobs suggests the likelihood that no single type of training program will, in the near future, be adequate to meet the needs of all kinds of vocational-technical workers. It is probable, however, that after further experience in dealing with this problem a special type of training institution will emerge. At the present time an institution known as the "technical institute" is being developed for the specific purpose of providing vocational-technical training. Its development offers much promise for an effective means of meeting the need. The effectiveness of whatever type of institution is utilized will depend upon the vigilance with which it is maintained as a specifically vocational school. There is the ever-present temptation to inject traditional academic purposes and procedures to the detriment of the strictly vocational objectives that justify the existence of the school. Whatever the agency that finally becomes dominant in providing vocational-technical training, the problem of meeting the need for such training will continue to be a major responsibility of the leadership of industrial education in the United States. The problems of organization, administration, curriculum development, selection of students, training and selection of teachers, and relating the program to existing educational programs are numerous and complex. Much careful research is needed to guide the leaders in the vocational-technical training movement, and a far more general and accurate understanding of the problem by educators and the taxpaying public is necessary before the most desirable solution will be possible.

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[4] *Ibid.*, p. 13.

QUESTIONS AND ASSIGNMENTS

1. Which of the several agencies now attempting to train vocational-technical workers do you believe are the most appropriate and best able to do the work effectively?

2. How do you account for the tardiness with which the problem of providing vocational-technical training has been undertaken by industrial-education leaders?
3. What reasons would you present to refute the claim that the problem of vocational-technical training should be left in the hands of the directors of corporation training programs?
4. Examine the list of technical jobs given in this chapter and indicate which of them clearly suggests the need for post-high-school training and which might properly be provided for at the high-school level.
5. Indicate in detail what you regard as desirable training, vocational experience, and personal qualifications for vocational-technical-school instructors. Give reasons for your belief.
6. Give reasons for and against assigning the function of vocational-technical training exclusively to the junior college.
7. To what extent can vocational-technical training be provided by the existing public vocational-education program?

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Chapter 15

TRAINING OF FEMALE INDUSTRIAL WORKERS

Changing Status of Women. The industrial revolution producing, as it did, the rise of the great industrial cities with the consequent changes in living conditions and family life, has imposed a new economic burden upon women. Women's work formerly was that of contributing labor directly to the family welfare, but the new conditions of life require an increasing number of women to contribute earned money to the family support. These women, therefore, have been forced to perform their work outside the home and to enter the competitive life of the commercial and industrial world. The extent to which women have responded to these changed conditions of economic life is clearly indicated by census figures. The astonishing success of women's work in those war industries which traditionally have been considered as men's occupations proves abundantly that women have achieved a totally new economic status, and this fact must enter as an important factor in all present and future efforts to raise the social and economic life of the nation to a higher plane of development.

The most dramatic change in the character of woman's traditional means of making her necessary economic contribution to the national life occurred during the First World War. The conventional opinion of what a woman could do in industry was that she was incapable of any work requiring mechanical skill or technical knowledge, but it became necessary from the beginning of the war for her to perform tasks that only men were thought able to perform. The results of this substitution of women for men in highly skilled work astonished everyone concerned, including many women. One employer reported: "In reference to the occupations in which women have replaced men, the following may give you some idea of the diversity of the work. In the machine department, women became expert and got out much greater production in running turret lathes, punch presses, bench lathes, milling machines, drill presses, grinding machines and engraving machines, and in addition to the operation of these machines we taught them to grind their tools, to act as job setters, and to superintend some of the departments. In the inspection department, practically every inspector was a woman. In the assembly departments, as well as in the inspection departments, all were women, and they did better work and got out more production than men whom we tried on the job at various times without success. We found, too, that we could place as much, if not more, dependence in women coming to their work and remaining on the job, which accounts for our having the lowest turnover in help in any factory ever heard of, which was less than 4 per cent per year. We taught women to inspect tools and check them over according to the drawings after they came from the tool shop, in which department women became expert. In the optical department most of the employees grinding lenses were women who were remarkably successful in the work. In the assembling of lenses we had none but women on the job and you will find by inquiring at the Ordnance Department that our lenses and prisms were as fine as any in the world."[1]

J. E. Shipper, writing in *Automotive Industries,* is quoted in the same source as stating, "One of the lessons of the war has been to show that women can do exacting work."[2]

The president of a large furniture-manufacturing company stated: "After the completion of the war contracts, we were naturally anxious to get back into our regular line. . . . Skilled labor being scarce, we distributed these women throughout our factory and we now have women in all our departments, viz., machine, cabinet working, finishing, upholstering, trimming, etc., and all making good and a big asset to our organization. We believe that there is hardly a line of work in which a woman cannot adapt herself if the right type is selected for the various lines."[3]

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[1] U.S. Department of Labor, Women's Bureau, *The New Position of Women in American Industry,* Bulletin No. 12, 1920, p. 48.

[2] *Ibid.,* p. 31.

Such testimony from industry served to give women a new character in the thinking of industrial employers and to bring to the attention of leaders in vocational education a new responsibility when planning programs of industrial education. Thousands of women remained in industry after the First World War, and many more thousands entered industry immediately preceding and during the Second World War, and it is evident that in the years to come they will constitute an increasingly important element in the industrial labor force of the nation.

The Type of Work Women Perform. In times of peace, women who remain in industry tend to move into the semiskilled and unskilled types of payroll jobs, notwithstanding their demonstrated ability during war periods to do skilled work of a high order. They are found in largest numbers in those industries where the need for technical knowledge and skill can be fully met by a relatively small number of technicians, where the machines are most nearly automatic, and where the hand processes require dexterity rather than mechanical skills. The table on page 180 shows the percentages of the total number of employees that are female workers in twenty-one industries, illustrating graphically the situation. It will be observed that the industries known to utilize the largest numbers of low-skilled workers are the ones in which the largest percentages of the total labor force are women. This is the typical situation concerning women wageworkers in industry. It is due primarily to the attitudes and purposes of women who work in industry. To most of them their jobs are merely a temporary means of making money and relatively few have, to the present, expected to remain long enough to justify the necessary training for jobs requiring technical knowledge and skill. There are, however, some indications of a change in the attitude of female industrial workers. One of the most significant trends is the increase in the number of older women found in industry.

Age and Family Status. The Women's Bureau reported in 1948 that the labor force in 1947 included 1¾ million more women thirty-five to fifty-four years of age than in 1940 and that threefourths of all the additional women workers in 1947 were from that age group. The increase of girls under twenty during the same period was only ⅓ million. There was, as one would expect, during the war years a large decrease in the number of women workers of ages twenty to thirty-four.[4] This report further indicated that slightly more than one-tenth of the employed women were fifty-five or more years of age, and it made the comment that "the growing importance of married women workers

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[3] *Ibid.*, p. 30.

EMPLOYMENT OF WOMEN IN MANUFACTURING ESTABLISHMENTS, SEPTEMBER, 1949[*]

Industry groups	*Per cent of total*
Manufacturing	27
Durable goods	16
Nondurable goods	38
Apparel and other finished textile products	75
Tobacco manufacturers	61
Leather and leather products	46
Textile-mill products	43
Miscellaneous manufacturing industries	41
Electrical machinery	34
Instruments and related products	34
Food and kindred products	27
Printing, publishing and allied industries	27
Rubber products	27
Paper and allied products	24
Chemicals and allied products	19
Fabricated metal products (except ordnance machinery and transportation equipment)	18
Ordnance and accessories	18
Furniture and fixture	16
Stone, clay and glass products	16
Machinery (except electrical)	13
Transportation equipment	10
Lumber and wood products (except furniture)	7
Products of petroleum and coal	5
Primary metal industries	5

[*] *The Monthly Labor Review*, February, 1950, p. 159.

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[4] U.S. Department of Labor, Women's Bureau, *Handbook of Facts on Women Workers*, Bulletin No. 225, 1948, p. 8.

continues a long-time trend in our industrial economy, in which money income has increasingly determined the family's standard of living." This situation is doubtless due in part to the growing number of women heads of families who have to work for money. In 1946 over 6½ million families had a woman head and such families increased from 12.7 per cent of the total number of families in 1930 to 15.3 per cent in 1940. Almost every factor in the life of the nation points toward both a continuous increase in the numbers of women industrial workers and their remaining over longer periods of time as a part of the industrial labor force. Every element in the economic and social life that brought women into the factory in the first instance has continued to increase in intensity and magnitude. The minute division of labor, the ever-growing use of machinery, the standardization of processes, the increase in the cost of living, the rapid growth of population and of urbanization have all been potent influences in attracting women to jobs in industry from the beginning of the factory era. The effects upon the social life of the nation of these influences and the response of women to them have wrought revolutionary changes in the social structure. For the most part the effects upon the family and the general moral climate of modern society have been harmful and destructive of much that has been regarded as most wholesome in American social life. To the present the social institutions that are most strategically placed to deal with such matters, namely, the school, the church, the laws and courts of justice, and the home, have failed to adjust their functions so as to deal effectively and constructively with the new economic status of the potential and actual mothers and homemakers of the nation. The problems posed are complex and reach to the very foundations of Western civilization. No one social institution can solve them, but the responsibility of the school to play an important part in attempting a solution is very great.

Responsibility of the School. The function of the school is to provide the guidance, inspiration, and experiences that will result in socially desirable growth, adjustment, and achievement of each person brought under its influence. Its first duty, therefore, is to become fully aware of the needs of its pupils and the highest standards of the society it serves. To the present there is little evidence that the school is fully aware of the problems created by the increasing numbers of girls and women that are working in industry or of the educational and training needs of such workers. If it were true, as it was a quarter of a century earlier, that from a third to a half or more of the female industrial workers were girls under twenty-one years of age and that they remained only a few years in industry, the problem would be difficult enough for the schools, but it would in no wise be comparable to the challenge presented by the present situation. There is, today, urgent need for careful study of the educational needs of both the girls and older women who are spending an increasing number of years as industrial workers. When these needs are understood by educators, provision should promptly be made to prepare future workers for the life they will be led, or forced, to live and to provide the kinds of assistance appropriate for schools to give to youth and adults who are employed in industry. Even a superficial survey of needs indicates that the educational experiences the school should supply are quite different from those provided for children, youth, and adults who will enter or who are engaged in occupations other than that of the industrial worker. Industry is instructive only to the extent to which the knowledge, intelligence, alertness, and background of the worker enables him to learn from his industrial experiences. It is at the point of preparing the worker to learn from his industrial environment and experience that the school can make its most important contribution to the vocational education of the majority of female industrial workers. Little or no industrial training is needed by most such workers before employment. The tasks they perform are relatively simple and can quickly be learned on the job. But the degree of interest in their work, of job satisfaction, of occupational self-respect, and of the other elements of a sense of achievement and happiness in their occupation, all depend upon their understanding of the meaning and importance of their work. Such understanding is a result of the ability to see beyond the simple operations performed to the significance of the operation in the total production scheme and the importance of the product. Industry is rarely concerned with this phase of employee training, notwithstanding that it is probably the most important element in job satisfaction and the prevention of excessive labor turnover. The schools can make an important contribution to the welfare of female industrial workers, and incidentally to industry, by providing experiences and information that will promote the needed interest and understanding of those destined to become industrial employees and by providing short evening courses for those who are employed.

Types of Courses Indicated. The kinds of courses needed in the junior and senior high schools that enroll among their pupils large numbers of girls likely to find employment in industry are not difficult to provide. They seem to be such courses as are found in the industrial-arts departments of many modern schools. Craft courses that include work in textiles, leather work, ceramics, art metals, etc., and that involve the study of materials and the industries represented by the several units of the course are likely to provide much valuable background knowledge for future female industrial workers. Also, the somewhat more commonly found general shop has much of value for such girls, including some elementary knowledge of machines. The value of such courses lies chiefly in providing knowledge and experience that lay the foundation necessary for interest in the materials and processes with which the girls will later work. For adults who work in factories similar courses could easily be provided by the public schools in evening classes. Besides these courses modifications in the social studies could be made so as to make them specially helpful to those who will enter industry on leaving school. To render such service the teachers must be persons who are thoroughly acquainted with the materials and processes of the industries where most of the dropouts and graduates find employment, and they must have an understanding of the many personal and social problems with which female industrial workers have to deal. Vestibule schools and better planned training programs provided by industry are greatly needed also. Vocational self-respect and interest in their work, that can come only from greater understanding, are basic in the needs of girls and women who must work in industry at the nontechnical and semiskilled kinds of jobs. An early study of the attitude of women workers and the character of the training needed indicated in most suggestive manner the folly of overlooking the *understanding* aspect of an employee's activities. It quoted a woman who had been a factory worker, as follows: "Another [girl] had worked nearly six months screwing little screws into a hole in a large piece of metal. *She had no idea what the piece of metal was for,* so one day when she saw a sign, "Girls Wanted," on a laundry, it occurred to her that *there she'd at least understand what she was working on,* so she gave notice and changed jobs."[5] Later, in the same statement, she said "A half-dozen women worked at the bench opposite me—they lasted two weeks at the longest and I stuck, *hoping finally to find out what it was all about. I never found out.* The tendency, after an experience like that, is *to change to a job that you can understand.*"[6]

The Skilled Worker and Minor Executive. Since the Second World War, women have remained longer in industry than formerly, and larger numbers occupy jobs requiring more skill and technical knowledge. An increasing number seems, in recent years, to aspire to supervisory and executive jobs. However, few are willing, while young, to serve the apprenticeships required of the highly skilled mechanic. For the most part those who have reached the more skilled jobs have done so by means of the pick-up procedure over a long employment in the plant, which is an informal type of apprenticeship. These more ambitious workers, who expect to remain in industry long enough to justify acquiring training for the better jobs, have available the same opportunities as male workers if they choose to use them. There are, in many of the larger factories, plant schools they can attend. There are part-time trade extension and evening classes in the public schools, and there are home-study schools from which they can obtain technical instruction. In the rare cases where girls of school age decide to find their work chiefly in industry and desire to advance themselves in their work, the public trade schools are available. The number of those who look forward to a career in industry is still small, however, and a very great change in the social patterns of the national life will have to occur before their training needs become a major problem of industrial education. Meanwhile it would be the part of wisdom to give far more attention to the study of their educational needs than is now being given by leaders in the fields of education and sociology. The problem of their training and education also involves complex economic considerations as well. As living costs rise and standards of living decline, women will increasingly have to find work outside the home, and for many thousands it will have to be in industry. In the course of time it appears to be inevitable that much larger numbers than at present will want to prepare themselves for the skilled and supervisory jobs. This will require a greatly enlarged program of industrial education for girls and women, both in the public schools and in the factory schools.

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[5] Italics are the present writer's.

[6] "Why Women Change Jobs," *The Literary Digest,* Nov. 24, 1923, p. 27. (Italics are the present writer's.)

Summary and Conclusions. The economic status of women has undergone a great change since the beginning of the factory era. In towns and cities women can no longer make their necessary economic contribution to family support merely through service in the home. They now must contribute money, and to earn money under modern city conditions they are compelled to work outside the home. The social consequences of this necessity have been very great and, for the most part, destructive of much that has been through the centuries most valuable in home life. The work they usually do in industry is of the type that makes few demands upon either skill or technical knowledge. Women have fully demonstrated during war emergencies that they can successfully do the most exacting skilled and technical work that is usually done by men. The fact that women are found in largest numbers in industries that require little skill is because they are unwilling to pay the price of long training for jobs they do not regard as permanent. However, in recent years there has appeared a trend toward women's remaining permanently in industry, and this trend suggests the growing importance of careful study of the industrial education needs of female industrial workers. An increasing number of women are found to be heads of families with major responsibilities of family support. Obviously such women need as careful training for their work as do men employees who are heads of families. Much can be done for these women by existing vocational-industrial-education programs in the schools and in plant training programs. Girls and women who work at the low-skill jobs need the type of preemployment training now afforded by the best departments of industrial arts in the upper elementary and the secondary schools. The problem of the industrial education of female wageworkers in industry has long been neglected but needs careful study today and will certainly be of increasing urgency in the years immediately ahead.

QUESTIONS AND ASSIGNMENTS

1. What are the specific elements in modern economic life that make it necessary for millions of girls and women to work away from home?
2. How do you account for the increasing numbers of women who remain permanently as industrial workers?
3. What are the most serious social consequences of the necessity of women's work outside the home?
4. Why are so few girls willing to take training for a skilled trade in school or to serve an apprenticeship?
5. If you were a city director of industrial education in an industrial city of about 500,000 population, what provision would you make in your total program for the training of female wageworkers? Be specific, and indicate the steps you would take to put in operation your program for girls and women.

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Chapter 16

TRAINING WITHIN INDUSTRY

Background Influences. From the beginning of the factory era specialization and standardization of production processes and of products, and the multiplication of specialized tools and machines, have had a revolutionary effect upon the problem of industrial training. In fact, it was chiefly these characteristics of modern industry that caused the rapid disappearance of traditional apprenticeship, since each industrial plant required its employees to possess its own specialized skills and methods of production. Hence, it is not surprising to find American industry very early attempting to train its workers in the factory itself. Public agencies of industrial education have never been concerned with the highly specialized training needed by workers and probably should not be, since such training is narrow in its applications and restricted and localized in its immediate benefits. The thousands of different skills required and the simplicity of many of the processes for which training is needed make the problem essentially one of private, or corporation, responsibility rather than one of public concern. Because of the short time needed for acquiring a specialized skill many manufacturers have been misled into thinking that no direct training is needed and have depended on the haphazard method of pickup, or learning by trial and error on the job. However, as quantity production has developed and more effective methods of estimating production costs have been adopted, it has become increasingly clear that the rapid and effective training of the specialized worker is a large factor in efficient production. The conditions enforced by the world wars did much to drive home this important fact, and renewed interest has resulted in this phase of industrial training. But the training of the machine operator and the other specialized workers in the factory is not the only type of corporation training that has been developed in American industry. There is some evidence that industry is slowly moving toward the conclusion that the entire personnel should be continually under some form of conscious, directed training if production, management, and distribution are to be efficiently carried on. As a result the corporation school or training program, which is not new but which has existed chiefly as a sort of hobby of a few great industrial organizations, is becoming an accepted phase of many corporations that employ sufficient numbers to make the maintenance of a training program practicable.

Growth of Corporation Training Programs. The training-within-industry movement, that developed very slowly at first, has had a relatively rapid growth in recent years. The early programs came into existence before the public schools made any attempts to offer industrial training and when industry's greatest need was for skilled mechanics. Hence, these early corporation schools were nearly all apprentice schools for the training of the highly skilled all-round mechanic. That type of training is still one of the most commonly found. This fact is of great significance to the student of industrial education. It is usually assumed that, if the public schools are to accept any responsibility for the specific industrial education of American youth, it must be for the training of the skilled mechanic and for the technical education of the minor technical executive. It would seem that either the efforts of the schools are largely inadequate or that industry lacks confidence in the ability of the public schools successfully to do the work. It is probable that the real solution of the problem lies in a genuine cooperative effort on the part of industry and the schools. Certainly there is unnecessary duplication of effort when both agencies are working at the task independently.

It is probable that R. Hoe and Co., Inc., of New York City, the manufacturers of printing presses, was the first of the large corporations to establish a plant school. This school, established in 1872, has been from the beginning a school for apprentices in the skilled trades, chiefly for machinists.[1] Other corporations which established such schools were the Westinghouse Machine

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[1] See Morris, John Van Liew, *Employee Training*, McGraw-Hill Book Company, Inc., 1921, p. 124.

Company in 1888, the General Electric Company and the Baldwin Locomotive Works in 1901, and the International Harvester Company in 1903 (1907 at their McCormick plant). After 1905 the railroad companies began the establishment of apprentice schools and continued it until the practice became general among them.[2] Among the important corporations, other than those mentioned, having schools in 1920 were Western Electric Company, Westinghouse Electric and Manufacturing Company, Goodyear Tire and Rubber Company, Ford Motor Company, Packard Motor Car Company, Norton Company, Winchester Repeating Arms Company, Mergenthaler Linotype Company, Carnegie-Illinois Steel Corporation, National Cash Register Company, Pratt and Whitney Company, Brown and Sharpe Manufacturing Company, The Warner and Swasey Company, Yale and Towne Manufacturing Company, Westinghouse Air Brake Company, De la Vergne Company, American Locomotive Company, R. R. Donnelley and Sons Company.[3] There are many other important corporations maintaining schools today. Many problems are involved in the establishment and maintenance of corporation training programs, but the larger companies seem to regard such programs as necessities, and there is a marked tendency to enlarge the whole scheme of training to include all levels of employees.

Objectives of Programs. Throughout ancient and medieval history the responsibility for the training of skilled craftsmen was assumed by the crafts, but since the craftsman of those eras was also the employer, it may be said that the employer has throughout history accepted the responsibility of training his employees. Notwithstanding that during much of modern history, both in Europe and the United States, public agencies have played a part in the training of industrial workers, the employees have continued to play a major role in the training programs. Organized labor in the United States, throughout its history, has been more favorable to training provided by employers than that provided by the public schools, strange as this may seem. Industry has assumed generally that it is the only agency capable of providing adequate training of industrial workers. The attitude of labor seems to be due to the belief that it can more completely control the numbers trained and the quality of training provided when industry is the training agency than when the public school provides the training. Industry has other objectives in its training programs. Training improves the quality and lowers the cost of production. It also increases job satisfaction and ability to make adjustments to factory procedures and to the production organization. Brophy, in his study of New York industries, said: "The desire among managements to encourage workers to take training may stem from many motives. Some recognize that well-adjusted workers are invariably competent workers; some recognize that a job standardization and process control are predicated upon a trained work-force; and some recognize that employment stabilization is dependent upon the versatility of the working force and that training is an important control in developing this versatility. Irrespective of motive, plants are actively encouraging their employees to take training both in their own interest and in the interest of greater productive efficiency."[4] Industry also wants the training of its employees to be such as to fit its particular production procedures. The ultimate objective of industry is the making of profits. If a given training program does not contribute measurably to increasing profits, that program is either abolished or changed. Management is not indifferent to the welfare of employees and usually insists that the objective of training programs is to promote the advancement of the individual worker as well as to benefit the corporation. The fact remains, however, that the design, maintenance, and development of training programs within industry relate much more closely to the production of dividends than to the vocational training of individual workers. To point to this fact is not necessarily a condemnation of industry, since the primary reason for its existence is production and profit. The schools of society are maintained for the education and training of the people; industry has a different objective.

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[2] See Douglas, Paul H., *American Apprenticeship and Industrial Education*, New York, Columbia University Press, 1921, p. 213.

[3] See Morris, *loc. cit.*

Types of Training Programs. Since the purpose of a corporation school is the training of workers to meet the special needs of the individual plant, standardization of practice among the various companies does not exist. As a result of this condition there are several fairly distinct types of corporation schools. As was indicated earlier, most of them are apprenticeship schools for the training of skilled mechanics, but even among the schools for mechanic apprentices there is a wide variation in types. This variation is conditioned by the particular theories of training held by the directing officials, the character of the products manufactured, the character of the organization of the plant, and the trade for which the apprentice is being trained. Without, therefore, knowing these factors it is impossible to evaluate any particular type of school or class. The various types of apprentice schools may be grouped roughly into (1) schools in which both skilled mechanical processes and related technical knowledge are taught in the plant school and (2) schools in which only related technical information is taught in the plant school, the skilled processes being learned on the factory floor. The latter group is much the larger. In both groups there must be a supervisor of apprentices, by whatever name he otherwise may be designated, whose work is to select, classify, and direct apprentices until the day of their graduation. The most usual practice is to require four hours per week in the school, where mechanical drawing, mathematics, and other necessary related technical subjects are studied. The remainder of the time is spent on production under production foremen, but the time spent in the different departments is determined by the supervisor of apprentices. The entire course ordinarily covers four years and is so planned that the apprentice will receive a well-rounded training, passing at predetermined intervals from machine to machine and from department to department until the entire course is completed. The effectiveness of this scheme depends very largely upon the attitude, character, and cooperation of the production foremen. Where proper coordination and cooperation exist, such a scheme is probably superior to that of giving both skill and technical information in a separate school. There is something more or less artificial about even a factory school, and where instructional values are properly provided for on the production floor, such a program of training is to be preferred. There are numerous variations of this general plan found in factory schools. In some, a combination of the two schemes is used by which part of the skilled processes are learned in a school shop and part on the production floor. In some cases the corporation depends on the public schools to teach the related technical information; and in a few cases the public schools furnish part of the mechanical training. This cooperative method of part-time industrial education seems to be the only way by which the smaller plants can carry on effective training programs, and since the overwhelming majority of factories are small concerns, much more attention might well be given to this problem by the public schools.

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[4] Brophy, John M., *Training in New York State Industries*, p. 10.

The training of skilled mechanics is by no means the only sort of industrial education attempted by manufacturing corporations. As was indicated at the beginning of this chapter, there is an increasing interest in the training of specialized workers. The wastage of material, the misuse of equipment, and the causing of many accidents resulting in personal injury and death constitute heavy drains on modern industry, and it is conceded that all of these bear a direct relation to the amount of proper training possessed by the rank and file of the workers. Different methods have been used within recent years to meet the training needs of the larger groups of workers; among these are the vestibule school and foremanship training. Where the number of employees is large enough to justify the expense, the vestibule school seems to be a desirable means of training for the specialized tasks. The plan ordinarily used is to provide a room equipped with one or more of each of the machines used in the plant. The newly employed person is assigned to the instructor in charge of this room who teaches him, on a production job, the special processes he is later to perform on the production floor. He is taught also factory rules, factory routine practices, and safety regulations. The instruction is complete when the new worker attains a predetermined degree of speed and accuracy in his work. The course lasts from a few days to a few weeks, according to the character of the work he is to do. A variation on this scheme is that of marking certain machines on the production floor as student or beginners' machines and assigning the new employees to these machines, where they work under an instructor rather than a regular production foreman.

Foreman training has been shown to be of such great value that its place as a means of industrial education seems assured. All other types of corporation training being developed by American companies may be grouped as (1) upgrading, or promotion, training for employees who want to improve their work or to prepare for the next step in promotion and (2) adjustment training for technical-high-school and college graduates. In large companies where an education or training department exists, many methods are used to offer the training desired. In some cases an evening school is established by the company, or the public evening schools cooperate with the training department of the corporation. The evening school finds its greatest usefulness in offering general educational subjects and related technical subjects to the clerical workers, the highly skilled mechanics, and the technical workers. In some cases special conference courses are offered in the plant for minor executives. Throughout industrial organizations the use of corespondence courses is usually encouraged. Some companies, notably certain of the public utilities corporations, organize frequent short-unit courses for special groups. For technical-high-school and college graduates special training schedules are maintained in many companies. These consist of a carefully worked out program of tryout experiences in numerous kinds of work, followed by an intensive training in some one phase of the company's activities. This apprenticeship, or adjustment training, ranges in length from one to three years in most cases. Its purposes are (1) to familiarize the young graduate with the work of the corporation, (2) to enable him, through tryout or finding experiences, to choose the particular department or type of work for which he is best fitted, (3) to train him in the practical applications of the principles he has studied in school, and (4) to adjust him to, and to start him in, the organization which he is expected later to help direct. Much importance is attached by industry to this phase of corporation training, and in many respects it has been the most successful phase of the entire program of industrial education in industry.

The National Industrial Conference Board has classified the different types of in-plant training programs as follows: (1) all classroom training in classrooms in the plant, (2) all vestibule training in special rooms in which working conditions are reproduced as nearly as possible, (3) programs involving (1) and (2), (4) all on-the-job training with some instructional supervision, (5) programs involving (1) and (4).[5] In a survey made in 1943 it was found that 96 per cent of the companies studied provided training that involved a combination of classroom study in classrooms in the plant and training on production jobs.[6] For the training of apprentices this is the usual type of program today. Carefully planned training programs are found almost exclusively in large plants. Small plants depend upon the pickup method of learning by beginners with or without some assistance from the foreman. Many large plants also depend wholly upon the training-on-the-job manner of developing skill and technical knowledge. An increasing number of companies stress the training of foremen and lead men who, in turn, are expected to train new employees on-the-job. The importance of training foremen, lead men, and supervisors was so thoroughly demonstrated during the emergency production experiences of industry during the Second World War that training programs for them have become increasingly common. When the training program of such minor executives includes teaching procedures, on-the-job training can become a very effective means of training production employees. Increasingly in the larger plants well-integrated apprentice-training programs are being developed for the training of skilled workers; and as the growing necessity for technical knowledge, as well as skill, continues to be a factor in the work of skilled employees, the apprentice programs as now organized may be expected to increase rapidly. Brophy found in the New York plants he studied that "on-the-job training programs were the major concern among nearly seventy per cent of the plants reporting; apprenticeship followed in importance among nearly two-thirds of the plants. Of least concern were out-of-hours training in general courses, listed by six per cent of the plants; and pre-employment or vestibule courses, checked by fifteen per cent of the companies."[7]

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[5] International Labor Office, *Vocational Training of Adults in the United States*, p. 107.

[6] *Ibid.*

[7] Brophy, *op. cit.*, p. 3.

Cooperative Programs. In a national program of industrial education there should be no duplication of effort, nor should responsibility and function be misplaced. The agency which is best fitted to assume a phase of training should be responsible for that phase, provided it is not contrary to wise public policy. Obviously industry and the public schools must share the responsibility for the industrial education of those who work in industry. It seems clear that a democracy can ill afford to leave to any particular economic group the important task of training boys and girls in citizenship and of teaching them the economic and social theories needed by all intelligent citizens. It seems clear also that the public schools have no right to shirk the duty of teaching trades to the boys and girls who expect to engage in the skilled manual occupations that require long training, in so far as the schools can effectively give such training. On the other hand it does not appear evident that the schools should be required to assume the burden of teaching the thousands of simple, highly specialized skills which are constantly being developed in the different privately owned factories of the country. Nor can the schools adjust their own graduates to the special applications of technical knowledge in individual plants. Thus there appears this reasonable division of responsibility in the program: (1) the public schools should provide either wholly or in part for the training of those industrial workers who enter complete, skilled trades of such character that they require a prolonged, carefully balanced training; (2) the corporation schools should supplement the work of the public schools by training in those mechanical and technical skills which the public schools cannot effectively teach; (3) the corporation schools should teach the simple, highly specialized skills belonging to the peculiar processes used by the individual factory concerned; and (4) the corporation schools should attend to the special training necessary in adapting the public-school graduate to the work of the individual corporation. There are numerous administrative problems involved in a coordinated program planned on this basis, but there are no insuperable difficulties. Intelligent cooperation in the assumption of responsibilities is the only hope for the small factory and the various concerns employing workers in the custom and repair trades to obtain their share of trained workers and, indeed, is the only way by which an effective national program of industrial education can ever be developed in this country.

Where cooperative programs of training have been developed under competent leadership from the head of the public-school department of industrial education, highly satisfactory results are usually obtained, and both industry and the schools are greatly benefited by the relationship. In any phase of industrial education and training there are features of the process that can more appropriately be provided by industry and others that can best be supplied by the schools. In a democracy it is desirable that economic, social, and political concepts needed by young industrial workers be developed in their thinking by public educational agencies rather than by special economic social or political groups. Such concepts rarely are presented to learners in an unbiased and wholly truth-seeking manner by specially interested groups. In fact it is a questionable practice for the state to permit special economic groups unsupervised by the state to teach the social sciences to youth of school age. This is an additional reason for advocating cooperative training programs in which the public schools and industry work together in the industrial education of young workers.

Limitations of Corporation Training Programs. It is significant that most of the organized training programs within industry are found in the very large concerns, usually in companies employing from one thousand to many thousands of employees. Few small companies can meet the costs of training programs, nor can they have a sufficient number of employees in training and away from production to justify an organized program. Since the number of large plants is very small and many of them have no effective training programs, the unwisdom of depending wholly upon industry to provide the industrial education needed by the nation is apparent. Not only is it true that organized training programs within industry are relatively few in number, but trainee mortality in those that exist is very high, notwithstanding that most corporations having programs select their trainees very carefully. Besides, the stealing of graduates is often practiced by companies that do not have programs and can therefore pay higher wages to the graduates than can the companies that paid the cost of their training. This practice has discouraged some companies from developing training programs. Another limitation on the effectiveness of corporation schools or programs is the reluctance of the companies to employ trained teachers. This weakness is apparent to any one who knows the value of effective instruction and who observes the work of corporation schools. It, no doubt, is a factor in the relatively large trainee mortality of corporation schools. There are some indications that industry is beginning slowly to realize that effective education and training require on the part of its instructors specialized knowledge of the organization of instructional materials and of methods of teaching. A few large companies have in recent years employed trained specialists in industrial education to direct their training programs. This is a step in the direction of placing training within industry on the same basis of effectiveness as is required in all the other phases of modern industry.

Characteristics of Corporation Training. There are certain well-marked characteristics of the training activities carried on by industry. In the first place industry has a distinct point of view in its educational program which colors all its work, namely, the point of view of profit. The training must pay dividends. Industry is conducted primarily for the purpose of paying dividends, regardless of the fact that many great business magnates profess to be primarily concerned with contributing, through their productive activities, to the progress of the nation and of civilization. However sincere these professions are—and they doubtless are usually sincere—the fact remains that dividends must be paid or the whole structure falls. Industry is not primarily organized for the purpose of education, and any education or training enterprises it may develop or foster are subsidiary to its main function. This results in a point of view and a set of standards quite different from those of the schools, the latter being organized and supported solely for the purpose of education. The public school asks itself, "Does this line of action contribute to the welfare and development of the student and of society?" Industry is impelled to ask, "Does the training we offer benefit this factory and add to our profits?" The difference between these two questions marks the difference between the point of view of the public school and that of the factory school. There can be no just criticism of industry because of this attitude. The value of the education provided by industry depends wholly upon its effectiveness in meeting the specific needs of industry. If the needs are such that broadly conceived, well-balanced training is desired for its workers, such a training will be offered. If, on the other hand, a very narrow, highly specialized training that offers no valuable development of the worker for any other work is needed, such a sort of training will be given. In fairness to the corporation schools it must be said that very conscientious efforts frequently are made to contribute to the personal development of the young student-worker beyond his immediate vocational-training needs, but the very atmosphere of the plant, of necessity, restricts the influence of the educational program to narrow limits beyond the specific factory requirements. This fact raises the question of the desirability of industrial education in industrial plants attempting to do more than give the mechanical and technical training required for success in the particular industry concerned, as indicated above. It is questionable whether it is desirable for industry to offer courses in such subjects as citizenship and economics, by whatever names these may be called in the curriculum outline. It is at this point that there should be the greatest degree of cooperation between industry and the public schools. Undoubtedly industry can teach the particular skills used in its peculiar tasks better than the public schools, and it is equally certain that the latter are better prepared safely and effectively to build up desirable attitudes and to teach facts about economic and political life which accord with the public welfare. If the schools have failed in their work, the remedy lies in improving the schools rather than in delegating their responsibilities to industry.

Certain Elements of Strength. Training within industry possesses certain inherent elements of effectiveness that cannot be duplicated by the public schools. Because industry is operated for profit and must meet strong competition, it cannot afford to use any but the most modern and efficient equipment; hence, the learner is trained from the beginning of his instruction on such equipment. The schools, supported from taxes, rarely are able to discard usable machines and substitute the latest types. Furthermore, the instruction provided within industry is conducted in an atmosphere and under conditions of actual production with production standards of speed and accuracy. Such conditions can rarely be successfully simulated in the public schools. This is perhaps the greatest single advantage that the factory school and the production job have over the public or private trade school. Also, since the shop instruction usually is given by means of making projects that go into the assembly lines, the student early in his training acquires a sense of responsibility for accurate and salable work that is difficult to develop in the schools. Industry also has the advantage of being able carefully to select its students and is under no obligation to train any who desires training unless he is wanted as a trainee by the employing company. Finally, the fact that trainees in factory or on construction jobs are paid wages while under instruction constitutes a distinct advantage that the schools cannot enjoy. The extent to which these advantages compensate for the limitations under which the program of training within industry operates is a debatable question. It is probable that the answer to the question depends upon the trade or occupation for which training is given, the quality of the instruction provided, the age, other factors involved in the selection of trainees, and upon the administrative policies of school or of factory program.

Trends. Considering industry generally, it seems clear that far too few companies are vitally interested in sound training programs. It is also clear that there is a growing interest, particularly among the larger industrial corporations, in the development of employee training programs. Among some of the best developed and best administered programs there is a tendency to broaden the program so as to give training that produces workers who are well grounded in the fundamentals of their occupations and are, therefore, more versatile in their abilities. One widely known factory school, for example, in a two-year course for machinists requires two hours per day in classroom work, besides six hours per day of work on fundamental machines in a training shop. This classroom course provides thirty hours of study of machine-shop practice, thirty hours of mathematics, including arithmetic, algebra, and geometry, thirty hours of trigonometry, twenty hours of technical sketching, forty hours of heat-treatment and practical physics, and twenty hours of industrial economics. Industry has learned that mere hand training in the mechanical processes of production is not adequate to justify the cost of a training program. As this realization grows among employers, it seems obvious that many existing programs in the large industries will be greatly expanded, and the small plants will of necessity have to enter into cooperative arrangements with the public or private trade schools. It is probable that, where the cooperation is close and real, both in spirit and practice, the public schools can provide much better instruction in the related subjects than can the factory school.

Summary and Conclusions. Before the advent of machine industry and the modern factory all production was the work of skilled craftsmen. In the modern factory the semiskilled operative is the one whose function is production, while that of the skilled craftsman is chiefly maintenance. There are exceptions in a few industries that produce special custom-made products, but in most cases where standardized products are manufactured, the skilled methanic has little direct relation to production. This fact serves to make the training of industrial workers in modern industry a much more complex undertaking than it was before the factory era. Semiskilled and unskilled workers need some degree of training and close supervision; hence, the modern training program in industry involves, besides the training of apprentices, the induction of the semiskilled and the unskilled. The one who inducts the unskilled into his job and trains and supervises the semiskilled is the foreman, who needs careful training for his duties. Beyond the training needs of these groups we have those of the technical workers and engineers, who need special adjustment training to teach them how to apply their school-taught knowledge to the special conditions existing in the plant in which they work. Hence, a complete and adequate corporation training program is a highly complex undertaking, and only the largest companies can hope to maintain such a program. The only manner in which smaller plants can meet fully their training needs is to work in close cooperation with the industrial-education departments of the public schools. Even in the largest plants there is much to be gained by society, industry, and the individual worker when the training program is operated as a cooperative enterprise between industry and the public schools. Such a program not only ensures continuous training of the learner through periods of unemployment, but it is a safer procedure in a democracy when each of the agencies involved is allocated its appropriate functions. The school is obviously the appropriate agency to teach the social sciences and the foundation knowledge upon which industry can build specialized skills and technical knowledge. The schools can also play a large part in training skilled workers where industry cannot or does not provide adequate training. In all cases the public school has the social responsibility to ensure the opportunity for the training of all who need it.

QUESTIONS AND ASSIGNMENTS

1. What are the characteristics of modern industry that make the need for training programs within industry urgent?
2. How would you defend the proposition that citizenship, economics, and other social subjects should be taught in the public schools rather than in the factory schools?
3. If you were responsible for planning a complete program of training for a large industrial plant, what would you include in your plan?
4. How would you defend the proposition that a cooperative program of training involving the plant school and the public school is a "safer" type of program in a democracy than one involving only industry?
5. List in parallel columns (*a*) the limitations and (*b*) the special advantages of corporation schools.
6. List the different types of corporation training programs, and indicate the advantages and disadvantages of each.
7. How do you explain the slowness of the development of programs of training within industry in the United States?

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Chapter 17

ADMINISTRATION OF INDUSTRIAL EDUCATION

Adminstrative Function. Any human activity having an intelligently conceived purpose and requiring the cooperative work of a group of persons necessitates an administrator. The essential function of the administrator is to exercise leadership in planning, provide the necessary facilities for action, coordinate the activities of those constituting his group of workers, lead and guide his group in action. Where two or more persons try to work together on a project, some one of the group invariably exercises leadership if success is attained. The necessity of the administrative function in human affairs seems to be inherent in the nature of human beings. All successful institutions from the family to the national government are successful to the extent to which their affairs are intelligently and effectively guided by an administrator. Schools of all kinds seem to be specially dependent upon wise and efficient administration if they are effective in their activities. The ablest teaching staff it would be possible to obtain by any school would soon be working in confusion and would become wholly ineffective without a wise, strong administrator over it in authority. It is a fundamental of all forms of democratic government that there must be an administrator to lead in group action and to execute the decisions of the group. To be effective the administrator must be given a large degree of authority and freedom to act. In no other area of the school enterprise are these principles more evident than in the industrial-education phases of the school organization. Without careful, wise planning, provision of necessary facilities, maintenance of desirable public relations, selection of a qualified staff, and effective leadership in action no department of industrial education can be successful.

Special Features of the Problem. The administration of industrial education presents problems of special complexity and difficulty not found to the same degree in any other phase of school work, except in that of the general administration of the school system. This results from the need for the purchase, storage, and distribution of large quantities of many different items of consumable materials; the purchase, installation, and maintenance of costly and often complicated equipment; the maintenance of close and friendly relations with both labor and employers; constant mediation between the local school authorities and interested community groups and individuals outside the school organization; the maintenance of public favor and support that is necessary to meet the relatively large costs of industrial education; and the maintenance of cooperative relationships between the industrial-education department and the other divisions of the school. In addition to these functions the administration of the vocational phases of industrial education involves the maintenance of continuous cooperative relationships between the local school general administration and the state and Federal vocational-education authorities who are concerned with the industrial-education program of the public schools. The internal management of an industrial-education department requires exceptionally orderly and well-planned record schemes involving financial records, inventory records, maintenance programs, safety records, and pupil- and teacher-rating records usually required of department administrators. Because of the technical knowledge needed by the administrator of an industrial-education department the general administrator usually delegates all these duties to the industrial-education department head.

Public Relations. One of the most important duties of the administrator of industrial education is the development and maintenance of helpful public relations. With the exception of the athletic department of the school there is no phase of its activities that excites more public interest than does the work of the industrial-education department. This is due in part to the very great interest shown by the boys and girls in their shop and drawing courses and to the pride parents and relatives feel with regard to the projects made by the pupils in those courses. It is also due in part to the costs involved in the operation of industrial-education departments. It has been demonstrated many times that taxpayers willingly approve the necessary expenditures when they are kept fully informed with reference to the purposes, values, and results of the industrial-education program. Wise department administrators give much attention to means of keeping the public so informed. Procedures that have proved most effective are the frequent use of news items appearing in the local newspapers, including pictures of activities and finished projects made by pupils and the names of the pupils involved; addresses given by the department head, teachers, and pupils before community groups, such as the parent-teachers associations, the service clubs, the chamber of commerce, and the labor unions; carefully planned, special public visitation events, when the public is invited to visit the shops and drafting rooms of the school to observe the pupils at work; specially planned exhibits of pupil work displayed either in store show windows or at the school; and personal conversations with community leaders and the parents of pupils in which the purposes and values of the industrial-education program are made clear. Occasionally mimeographed or printed materials taken to parents from the teachers by the pupils are found useful in developing the understanding and favorable attitudes of the patrons of the school. These means of communication have been found effective, but their value depends upon the manner in which they are used and the personality and wisdom of the administrator who utilizes them.

In many communities the most difficult feature of the public-relations problem faced by the administrator is that concerning the local labor unions. The attitudes of national and state labor leaders toward industrial education in the schools, as expressed in official reports and public addresses, seem to bear little relation to the attitudes of local labor leaders and union members. In some cases where state and national leaders of a given union appear to be indifferent or antagonistic to public-school programs of industrial education, the local leader will be fully cooperative with, and enthusiastic about, the local program. It is also not uncommon to find the exact reverse of this situation. The success of the local program of vocational-industrial education is in very large measure dependent upon the approval and cooperation of the local unions. To a less degree the industrial-arts program also is affected by the attitude of local unions. Obviously no cooperative program of training between industry and the school is possible without the full cooperation of local labor groups. In view of these considerations the responsibility of the industrial-education administrator to maintain a close and favorable relationship with the local unions is very great. As in many other areas of human relations this is largely a matter of personality, tact, and friendliness. Imparting accurate information and engaging in frequent consultation with perfect frankness and honesty when dealing with union leaders are necessary elements in obtaining their cooperation and support. To achieve the desired relationships the administrator will have to go more than halfway in meeting with labor. In many cases where labor has opposed the work of the school, it has been due wholly to a misunderstanding of the purpose and nature of the school courses. In many more cases opposition might have been avoided if labor had been invited to join in the first planning of the school program. Labor always resents being presented with a finished plan for an industrial-education program that it is asked to approve and support. Usually, however, when labor is asked to aid the school to decide whether a program is needed, and, if so, to help from the beginning in its planning, there is likely to be no difficulty presented by labor opposition. To achieve desirable outcomes in this phase of public relations the administrator needs, first, to establish close personal relationship with labor leaders. This step is of special importance. Next, he must establish and maintain friendly relations with as many union members as he can. Whenever given the opportunity, he should appear before union meetings, and occasionally he should seek such an opportunity. When he can render a service to union members legitimately, he should not overlook the opportunity to do so. In final analysis successful dealings between the school department of industrial education and local labor organizations depend more on frank, tactful, personal relations than on any other single factor.

Organization of Advisory Committees. After establishing friendly relations with employers and labor leaders, it is in most cases highly desirable to organize advisory committees composed of an equal number of representatives from employers and labor. In the larger school systems, where an extensive program of industrial education is needed, it is well to organize an over-all advisory committee to advise the administrator and the superintendent on the total program and, in addition, a committee for each trade that is taught in the program. Usually a committee consisting of three representatives from labor and three from the employers with the industrial-education administrator as the nonvoting chairman will be found to be an effective size of group. It is highly important that advisory committees from the beginning shall fully realize that their function is only advisory and never administrative. The administrator should be careful to maintain a relationship to these committees that will not encourage them to assume any other function. It is also important that only those problems that necessitate advice with reference to policies and general procedures shall be presented to the committees. Among the matters with which it is well to seek their advice, as suggested by an Office of Education committee, are the following: the scope of the program to be operated; the planning and equipping of buildings; the groups to be served—such as high-school youth, apprentices, and adults; the nature and objectives of the training provided; opportunities for employment; and the standards for the selection and training of instructors.[1] In addition the advice of these committees is helpful when community industrial surveys are to be made and when major projects are being considered, such as the construction of a house by a class of carpentry apprentices. In all cases it is important that the industrial-education administrator shall take the initiative in organizing, in calling meetings, and in preparing the agenda of the meetings. These committees can become a major factor in the planning, promotion, and maintenance of a program when they operate under the wise leadership of the administrator of the program.

Internal Relationships. The establishing and maintaining of desirable relations with the other divisions of the school is, in part, a matter of personality and personal relations with the staffs and administrators of those divisions. It is also, in part, a result of their understanding the purposes and character of the industrial-education curriculum and courses. By giving attention on all appropriate occasions to explanations of the aims, special educational problems, and desirable relationships with general education, helpful relationships are developed. This is particularly the case when the industrial-education administrator can sincerely and intelligently exhibit an interest in the work of the other divisions of the school. When it is appropriate to do so, the help of teachers and department heads of the other departments should be sought by the industrial-education administrator and his staff. There are frequent occasions during the school year when they can aid in the instructional program and in planning revisions of curricula and courses. By rendering such help they are likely to become more interested in the work of the department and to acquire the knowledge that will remove many misunderstandings and prejudices that may exist and become a cause of undesirable attitudes toward the industrial-education program. In some situations it is expedient to make available to members of the faculty of other divisions of the school opportunities for working at suitable times in the school shops and drawing rooms. Where this can be done, it almost invariably stimulates helpful relationships that make the industrial-education administrator's work less difficult. It is remarkable how many adults desire the opportunity to make useful objects with their hands in order to learn to work skillfully and to experience the pride that always comes from such work, as well as to possess the useful things made. Much faculty support for the program of the industrial education department can be obtained by making the shops available after school hours to those who desire to use them.

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[1] Federal Security Agency, U.S. Office of Education, *Vocational Education in the Years Ahead,* Vocational Division Bulletin No. 234, Washington, D.C., 1945, p. 90.

Personnel Problems. The personnel problems with which the administrator has to deal are sometimes among his most difficult ones, and they are always present. They begin with the selection of staff members and end only when the administrator terminates his service. The supply of adequately trained teachers who possess desirable personality traits is always less than the demand. When there is an apparent oversupply of teachers, it is almost as difficult to find the right kind of teacher to fill a specific position as when there is a scarcity of teachers. This is due to the specialized character of most industrial-education teaching positions and the exacting demands of the work. The difficulty of obtaining desirable applicants for industrial-arts positions is particularly great. Such positions require a thorough general education, adequate professional training, and technical and mechanical preparation in a large number of areas of industrial materials and skills. Almost every position calls for training in a special group of areas, but the combinations of areas in which skills are possessed differ with individuals as a result both of their selections, while in training, of shop and drawing courses and of the available offerings in the teacher-training institutions from which the applicants are graduated. It is usually necessary to employ the person whose training most nearly meets the need and to rearrange the school courses and staff assignments to fit the qualifications possessed by available staff members. So long as there continues to be a complete lack of standardization of industrial-arts curriculums in the elementary and secondary schools, the administrator will be confronted with a difficult problem whenever he has to make additions to his teaching staff. The selection of vocational-industrial teachers is less difficult because they are usually expected to teach a single trade in which they have had years of experience, and the educational and professional requirements are less exacting. In both cases, however, the success of the program depends in very large measure upon the character and personality of the teachers, and, to the present, the measure of these essential qualities is chiefly a matter of administrative judgment. The administrator has to accept the responsibility for his failures in judgment when making selections of teaching personnel.

Other personnel problems are the maintenance of favorable staff relationships, staff morale, and the professional growth of the staff. Effective practices with respect to these problems are not different in industrial education from those used in the successful administration of the other phases of the school system. They depend for success upon the attitudes and character of the administrator and upon his training and wisdom in dealing with those under his authority. Friendliness, tact, and dependability are essential. His willingness both to consult with the staff when important plans are developed and decisions made with respect to policies and procedures, and to take responsibility for failures and bad decisions are also necessary. Aid in solving difficult teaching problems, encouragement of those who are in need of it, and unfailing honesty and fairness in all dealings with individuals and with the staff as a group are requisites of successful administration in industrial education as in all educational administration.

One further personnel responsibility of the administrator is the developing and maintaining of accurate and adequate personnel records, where a large staff is involved. Whether or not he is an advocate of teacher-rating scales, it is important in large organizations to have on file reasonably complete case histories of the individual staff members. These histories should at least include records of professional and technical preparation, specific agreements made at the time of employment, special achievements, professional contributions to publications, important committee services, public services rendered, relationships with pupils, parents, and fellow teachers, cooperativeness, safety records, and any special abilities and personality characteristics. Such case histories are a great aid in ensuring equitable treatment of staff members, in making duty assignments, and in proposing advancement in rank and salary. In small organizations such records are not usually necessary but would often prove of much value both to the industrial-education-department head and the general administrator of the school system.

Management of Physical Facilities. A very large and important part of the duties of the administrator of industrial education is the purchase, storage and distribution of supplies and tool replacements, and the selection, purchase, and installation of equipment. Where a purchasing agent acts for a whole school system, the part of the industrial-education administrator is no less exacting than when he makes all purchases himself for his division of the system. This phase of his duties requires a knowledge of standardized ways of designating sizes, grades, and quantities of a very large number of different kinds of materials and finished products. He needs to know, also, the manufacturing and supply companies that have the best reputations for quality of products and for reliability and promptness in making deliveries. In addition he must be fully aware of the policies and procedures of the higher school authorities with reference to purchases for the school system. A wise administrator will make much use of the knowledge of specialists on his staff in dealing with all these matters, but he is finally responsible for the successful functioning of all such activities. He is specially obligated to maintain accurate and detailed records of all supplies purchased, distributed, and consumed, and all equipment purchased and installed. The complexity of such records varies with the size of the school system and the business practices of the general administration, but in any case, for his own protection, fairly complete and accurate records are important. In those cases where a large number of machines and other types of costly equipment are carried on the department inventory, carefully kept records of maintenance, repair, and obsolescence are very useful. As far as possible students should be taught to use modern equipment, and excessive maintenance costs resulting from undue wear and tear and physical decay can often be avoided when an accurate record of original cost, age, and repair costs for each piece of equipment is available. A great waste of public funds could be avoided if school administrations maintained the kind of inventory records commonly used by industrial corporations. There is no economy in paying for costly repairs year after year on obsolete and worn equipment that should be replaced by new and modern types.

Federal and State Relations. The administration of vocational-industrial education usually necessitates close and friendly relationship with state vocational-education authorities and adherence to Federal regulations governing the requirements for reimbursement for part of instructional costs. Where a sincere disposition to work cooperatively with the state authorities exists, there is seldom any serious difficulty in developing and maintaining a program of instruction designed to meet local needs. Difficulties do arise where local authorities are reluctant or unwilling to conform to reasonable state regulations that are designed to serve the schools and to meet the legal requirements of the Federal Office of Education. Within the frame of state and Federal regulations there is much room for accommodation to special local needs; and in most instances where conflicts occur, they result from a lack of a spirit of cooperation and friendliness. Many difficulties can be avoided by frequent consultations between local and state officials when programs are in the planning stage and by making clearly stated written agreements before action is taken by local administrators. When agreement is not possible, it is usually possible to conduct part of a program without requesting Federal and state reimbursement. Trouble frequently arises over demands for partial support from the state vocational-education agency for programs or parts of a program of instruction that cannot be legitimately approved under the terms of the law or the state plan that has been agreed on by the state and Federal agencies. In some instances difficulties result merely from unfortunate personality traits of state or local administrators; in others they may be caused by unwise policies of either state or local administration. In all cases the important factor is a spirit of cooperation on the part of all concerned.

Program Development. Perhaps the most important function of the administrator of industrial education is the development of programs that adequately meet local needs. These needs usually involve both the nonvocational and the vocational phases of industrial education. Except in very large cities the head of the division of industrial education has the responsibility of administering both phases of the program, and where the administrator is qualified by training and attitude to administer both, much is gained by this kind of organization. The procedures involved in the development of programs of industrial arts and of vocational-industrial education are not identical; each requires characteristic procedures. In the case of vocational-industrial education the first step to be taken by the administrator is to obtain the cooperation of local labor leaders, employers, and state vocational-education officials. His next step is, with the aid of the cooperating agencies, to make a thorough industrial survey of the community to ascertain as accurately as possible the industrial-training needs that can appropriately be met by the schools. This survey may result in making use of all the tested means of meeting such needs and may include evening classes, part-time classes of two or three types, and day trade classes for a large number of trades; or it may indicate a need for only two or three types of classes. The program adopted should so far as possible be the result of full agreement with all agencies concerned. Likewise, the courses should be developed by agreement with the three agencies most concerned and, in addition, the general administration of the school. The industrial-arts program, being a phase of general education, should be planned in cooperation with the general-education curriculum groups of the school system. Since this program has a close relationship with the vocational-industrial-education program, it is also important that this relationship shall be considered by those concerned in its development. The industrial-arts program should grow out of a clear understanding of the educational objectives of this phase of general education and be considered in relation to the total educational purposes and practices of the local school system. Here, as in the case of the vocational program, the industrial-education administrator should exercise leadership in its planning and development. Whether there is a single administrator of both phases of industrial education or one for each, it is essential in both cases that the administrator shall be thoroughly aware of the underlying philosophy and the educational purposes and significance both of his specialized field and of general education.

Trends in Administration. There are two or three discernible trends in the administration of industrial education that seem to be significant. One of these, as suggested above, is to place both the vocational and the nonvocational phases of industrial education under a single administrator. When the person selected for such a responsibility is broadly educated and well trained professionally and technically, there is much to be gained by this practice. It avoids unnecessary duplication of equipment in some instances and makes for cooperative activity and effective integration of the total teaching program of the school system. Another trend is to require administrators of industrial education to meet the same standards of training, education, and administrative ability as those of the top-ranking directors of the school system, and, increasingly, the persons chosen are given the rank and salary that is commensurate with the difficulties and importance of their function. Finally, there is a disposition of top administrative agencies to draw the industrial-education administrator into the groups that make the decisions affecting the general policies of the total educational programs of the schools. All present indications seem to point toward an increasing recognition of the importance of the industrial-education administrator as a member of the executive staff of the school system.

Summary and Conclusions. The success of the educational enterprise depends primarily upon the efficiency and intelligent functioning of the administration of the enterprise. The administrator of an industrial-education department is the key person in the department. The best teachers soon become ineffective when trying to serve under an inefficient, unwise administrator. The administration of industrial education involves many duties and relationships not required in other phases of school management. In addition to many of the functions of the general administrator the industrial-education administrator has to perform special duties that require thorough technical training in areas closely related to mechanical engineering. The basic factors in his success, however, are his knowledge of the purposes of the school, the special educational significance of industrial education, and his ability to deal wisely and effectively with personnel and public-relations problems. Few other areas of the school enterprise involve to the same extent the close cooperation with community groups and with state and Federal authorities. Of fundamental importance is the maintenance of cooperative relationships with labor and employers. It is also essential that the industrial-education administrator be granted authority commensurate with his responsibility. Nothing is more injurious to successful administration than to place heavy responsibility upon an administrator and deny him the authority implied by his responsibility. Throughout the history of industrial education in the United States the position of the industrial-education administrator has continued to grow in influence and prestige.

QUESTIONS AND ASSIGNMENTS

1. What are the characteristics of industrial education that make necessary a special administrator of even a very small industrial-education department?

2. List the items of importance to be considered by the industrial-education administrator when planning for desirable public relations.
3. What are the chief problems the industrial-education administrator has to deal with in maintaining desirable interdepartmental relations.
4. Why is the advisory committee so important in the administration of industrial education?
5. To what extent should the industrial-education administrator take the initiative in developing cooperative programs of apprentice training?
6. What should be the relationship of the administrator of industrial education to the general administration of the school system?

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Chapter 18

TRAINING OF INDUSTRIAL TEACHERS

Training of Trade Teachers. The effectiveness of any department of organized education depends upon the training, knowledge, and personality of the teachers employed to give instruction in that department. The selection and training of teachers of industrial education since its introduction into the schools has been one of its major problems. Of special concern has been the selection and training of trade teachers. It is a universally accepted maxim that to teach a vocation successfully one must have successfully practiced that vocation. Hence, the trade teacher must be selected from those who have been successful workers in the trade to be taught. This fact is responsible for the unique character of vocational-industrial teacher training in the field of teacher education and training. Teachers in the area of general education are universally sought among the graduates of colleges and universities that provide professional education for teachers, but teachers of vocational-industrial education are sought among the men and women engaged in the industrial occupations. During the time of life when the future teacher of general education is in the first years of college the future trade teacher is serving his apprenticeship in industry, and while the young general-education teacher is gaining his first experience as a teacher, the future trade teacher is practicing his trade as a journeyman. The preparation of the trade teacher, therefore, presents a special problem of teacher training. The situation clearly suggests that in vocational-industrial education the training of teachers is primarily a matter of training in service rather than of preemployment training. Young tradesmen who seem to possess desirable character and personality and who want to become teachers of their trades, when employed as teachers usually are given brief directions concerning the starting of their instructional responsibilities; and as soon as possible after being employed, they are enrolled as "extension" or "extra-mural" students by the industrial-teacher-training agency of the state, and a process of training on the job is begun. When this procedure is supplemented by attendance at summer sessions of teacher-training institutions the results are usually remarkably satisfactory. In many states the trade teacher to be permitted to continue to teach is required to resume summer residence study at a teacher-training institution until he completes an extensive program of specified professional courses or until he acquires a bachelor's degree in industrial education. The specific requirements for state certification differ somewhat in the several states, but the general procedure of selection and training is much the same in all states.

What He Must Know. Beyond the legal requirements for certification and the procedures practiced in selecting and training trade teachers there are special considerations with which the teacher-training agencies are concerned. Among these are what such a teacher must know, what he must be able to do, and what he must be as a leader and teacher of young learners. The first consideration is usually the beginning teacher's knowledge of his trade. The certificating authorities try to determine whether his trade knowledge is adequate before he is permitted to begin teaching on a provisonal or temporary certificate. The means employed to ascertain the adequacy of trade knowledge is different in the several states, but usually it is determined chiefly on the basis of number of years of experience as a tradesman. The fundamental weakness of this method of determining trade competency is so obvious that many states supplement it by requiring written and performance examinations. Merely to find that one has spent a given number of years in a trade indicates little with respect to his knowledge or skill as a tradesman. A carefully planned examination is a far more accurate measure of trade competency, and there is a growing interest on the part of state and local industrial-education authorities in the practice of supplementing the requirement of trade experience with a thorough examination of trade knowledge and skill, conducted by competent examiners.

Certification requirements, however, are used primarily to determine whether the prospective teacher possesses the minimum trade knowledge and skill necessary to begin the work of teaching. The teacher-training agency is concerned with developing in the teacher the knowledge needed to be a competent instructor. Hence, the first step in training the trade teachers is to try to answer the question: What should he know? With reference to the technical aspects of his trade he should know more than how to perform the operations involved in his trade. He should know *why* they are performed as they are and the underlying mathematical or scientific principles involved. He can be a satisfactory trade teacher without knowing the underlying principles but not one of the best, and there is a great need for mechanics who have been trained by the *best* teachers. Furthermore, he should know how the mind learns and how skills are developed. Extended courses in psychology are not necessary to acquire this knowledge, but the trade teacher must possess a usable knowledge of the psychology of learning and be able to teach by means of scientifically tested procedures. Such knowledge and ability result chiefly from practice under careful supervision. It is also important that he have sufficient imagination to be able to understand the difficulties of the students he is teaching. Finally, he should know the social and economic meaning of the trade in which he is giving instruction and of the industry of which that trade is a part. It is the responsibility of the teacher-training agency so to instruct the mechanic-teacher as to stimulate in him an abiding interest in the great areas of knowledge that lie around and impinge upon the area of professional skills and factual materials involved in becoming a competent trade teacher. In no other manner can continuous growth in understanding and professional competency be ensured.

What He Must Be Able to Do. The teaching and human-relation skills needed by the competent trade teacher are difficult to acquire. As in all other kinds of teaching much depends upon the attitudes, personality, and aptitudes of the teacher. The mere completion of professional training courses seems to play a minor role in the development of competent teachers. Of primary importance are a genuine desire to become a good teacher and a feeling of real pleasure in the teacher's work. One possessing these qualities is far more likely to acquire teaching skill than one who lacks them, however thoroughly versed in professional knowledge he may be. Skill in effectively giving instruction, and in maintaining interest and a genuine effort to learn on the part of his pupils, is the important ability the trade teacher needs most. This skill can come only from intelligent practice. Besides being able to teach skillfully, the trade teacher must be able to work cooperatively with fellow teachers, school officials, with the labor leaders, and with employers of the community. This is, in part, a matter of teacher training, but it is chiefly one of character and personality. Furthermore, he must be skillful in evaluating the achievement of his pupils. This ability is largely the result of professional training, but is also an outcome of his standards of achievement and his growth in understanding. He must also be able to analyze his trade into suitable teaching units and to organize those units into an effective course of study designed to train competent craftsmen. He must be able to demonstrate skillfully the operations he attempts to teach to his pupils and to develop in them the habit of carefully analyzing and planning all their work. This habit is essential in first-class craftsmanship and is acquired chiefly from a teacher who possesses it.

What He Must Be. What the trade teacher knows and is able to do are made more or less effective by what he is—the kind of person he is. Frequently pupils are influenced more by the character and personality of the teacher than by any other element in the teaching-and-learning situation. Unimpeachable honesty, fairness, and high ideals of behavior and of workmanship are qualities universally admired and appreciated by pupils. Sufficient personal dignity to discourage undue familiarity on the part of pupils is always important in successful teaching. Trade teachers often fail in this respect. Respect for the teacher both as a person and as a craftsman is essential in a sound teaching situation. Such respect has to be won and scrupulously maintained. The teacher should be friendly and generous with his interest and help when it is needed and desired. Finally, he must be a student of his trade, of teaching, and of his pupils. Good teaching is difficult and makes heavy demands upon the teacher's strength, patience, and understanding and requires a large degree of awareness of his environment and an appreciation of the behavior that is appropriate at any given moment. Hence, the teacher needs always to be "wide awake" and willing quickly to change from one procedure to another as the teaching situation may change from moment to moment. This means that he must be versatile and not a slave to any one method of teaching, however effective that method may be in theory, but able to use all methods that experience and research have found to be sound.

To get the mechanic-teacher started it is important, first, to give to him usable rule-of-thumb methods; but as early as possible after he begins his teaching experience, he should be led to an understanding of the fundamental considerations that underly all intelligent, effective teaching. Trade teachers have demonstrated over the years that they are fully capable of doing the kind of thinking and learning that produces skillful, professional instructors who possess the background knowledge and versatility that are needed by all successful teachers.

The Related-subjects Teacher. There has been much discussion among industrial-education leaders concerning the question of who should teach the related subjects in a trade-training program. Some have held that the mechanic-teacher is the one who should teach the related materials since he will know from his trade experience what related knowledge is needed. Others have insisted that a teacher who is thoroughly trained in the related-subject-matter fields is the only one who is competent to teach effectively the mathematics, physics, or other related subjects needed by the student. It is probably true that the tradesman-teacher who thoroughly knows the related subjects needed by his pupils and has been trained to teach such materials will be more effective than will a special teacher who has not been a skilled mechanic. However, the tradesman who possesses the needed technical knowledge and teaching skill to be an effective teacher of the related subjects is very rarely found. Hence, there has come to be recognized a special type of industrial-education teacher known as the "related-subjects teacher." Experience has taught the necessity of requiring the related-subjects teacher to possess as part of his background qualifications some experience as an industrial employee. This experience seems to be necessary to enable him to select from the subject-matter field he deals with those parts that are really related. Teachers who have not worked in industry are prone to teach much subject matter that is unrelated to the trade being learned. Therefore, one of the points of emphasis in the training of the related-subjects teacher is the analysis of the trade to determine the phases of his subject field that are specifically related to the work of the trade. The teaching techniques involved are not different from those used by the best general-education teachers, except that the timeliness of the material presented at any given point in the progress of the trade student is of great importance. Unless the related material is learned at the time, or very near to the time that it is needed by the student in his shopwork, it does not become related material in the mind of the learner and must be repeated when he faces a need for it. This fact presents a serious difficulty in course planning and makes imperative close cooperation between the related-subjects teacher and the shop teacher when their courses are being planned and throughout the school year.

Perhaps the most important feature of the preparation of the related-subjects teacher is the development of a point of view that will enable him to appreciate the need of the learner for related facts and skills that are directly usable in the practice of the trade being learned. The specific purposes of his work need to be clearly understood, and he needs to appreciate fully the purposes of his pupils. His primary function is to lead his students to a mastery of the technical materials that will make them intelligent craftsmen as well as mechanically skilled workers. To achieve this end he needs thorough training in both the theory and techniques of teaching as they apply to industrial trade training. In addition he must know the requirements of the trades being taught and possess a mastery of the subject-matter field from which he selects the related materials he teaches. There is great need for improvement in present training programs designed to prepare related-subjects teachers. There are numerous unsolved problems in both the preparation and the teaching work of these teachers. What to teach; how to organize related materials, and when to teach them; who should teach the related subjects; how the teachers should be selected and trained; and many other such questions have, to the present, not been answered satisfactorily, and too little attention has been given to carefully and scientifically seeking the answers. Much research is needed in this phase of industrial education.

Industrial-arts Teachers. The demands made upon the professional abilities of the industrial-arts teacher make his training a much more complex undertaking than that of the trade teacher. Notwithstanding that he is regarded as a teacher in the field of general education and therefore is expected to meet the educational and professional standards of such teachers, he is also expected to have an extensive technical knowledge, to possess mechanical skill in several industrial areas, and to be well acquainted with the materials, processes, and employment conditions of modern industry. These expectations of employing and supervisory authorities, as well as of the school patrons, make the problem of preparing competent industrial-arts teachers by means of a four-year college curriculum extremely difficult. As a consequence the tendency for the college period to be extended through a fifth year is rapidly growing, as is the emphasis upon the desirability of some experience in industry. The teacher-training curriculums for industrial-arts teachers in the colleges and universities throughout the United States present a most confused situation. Even within a single state there is no uniformity of course requirements among the state-supported teacher-training institutions. To the present very little careful study has been given to the establishment of uniform standards of competencies as a basis for the development of adequate teacher-training curriculums and for certificate requirements. For the most part curriculums and graduation requirements are determined by available facilities in a given institution and the arbitrary decisions of faculty groups. Complete uniformity in curriculum offerings is probably undesirable, but some degree of general agreement with reference to the desirable competencies of industrial-arts teachers is greatly needed.

Method of Approach to the Problem. Too frequently those responsible for developing curriculums designed to train industrial-arts teachers merely attempt to imitate the program of courses of the institutions from which they were graduated; or they make a study of the catalogues of institutions of similar size and character to the one in which they are employed and try to provide offerings that are comparable or superior to those outlined in the catalogues studied. It is probable that a more defensible and more effective procedure would be, first, to consider with great care the fundamental function of industrial arts in the elementary and secondary curriculums of the schools. What major contributions to the education of the boys and girls of today should industrial arts be designed to make? What should be its character if it is to make such contributions? One of the most satisfying answers to these questions is the statement of objectives of industrial-arts teaching and the accompanying suggestions of procedures designed to realize those objectives, published in the American Vocational Association bulletin *Improving Instruction in Industrial Arts* and quoted in an earlier chapter.

A careful consideration of the implications of those statements and the indicated means of achieving them will suggest the competencies the teacher should possess. Such a study suggests at least the following competencies:

1. A knowledge of the psychology of the learning process and the basic purposes of general education and of industrial arts as a phase of general education.
2. A thorough knowledge of the techniques of teaching technical subjects and the use of tools and machines.
3. The ability to plan courses and prepare instructional materials needed for effective instruction in shop and drawing activities.
4. The ability to give skillful and effective demonstrations of the manipulative processes to be taught.
5. A knowledge of the principles of design as applied to useful objects of the kind that can be produced by students in school shops and of the best means of encouraging creative thinking in designing and making useful objects.

6. The ability to evaluate instructional outcomes in terms of the objectives of the courses offered.
7. A knowledge of contemporary industrial problems, including production methods, labor relations, industrial trends, job requirements, and opportunities in industry.
8. A knowledge of the characteristics of materials of manufacture and trends in the uses of both old and newly developed materials.
9. The ability to plan shop rooms, make up specifications for equipment and materials, develop and manage record systems, plan and direct safety regulations, and maintain equipment.
10. The ability to maintain desirable public relations and cooperative relations with the other divisions of the school.
11. The possession of a general education comparable to that of the other teachers of the school faculty.
12. A knowledge of the several areas of professional education that is sufficiently broad and thorough to insure continuous professional growth.
13. The possession of skills in, and technical knowledge of, two or more areas of industrial work.
14. The ability to stimulate careful thinking and planning on the part of the pupils and to aid them in the development of desirable habits of work.

An examination of these competencies, that seem clearly to be implied by the objectives, will give college authorities a sound basis for the selection of general, professional, technical, and shop courses needed in the preparation of competent industrial-arts teachers. This procedure has been successfully used in curriculum revision and seems to be far more satisfactory than those more often used. By listing competencies that are clearly implied by the functions, objectives, and procedures of industrial arts in the school curriculum and by developing a teacher-training curriculum that is specifically designed to produce those competencies the curriculum will be based upon a solid foundation. As teacher-training institutions come increasingly to agree on the desirable competencies of industrial-arts teachers, the present unfortunate condition with reference to professional curriculums will be greatly improved.

Teachers' Attitudes. A persistent complaint of school administrators concerning the industrial-arts teachers on their staffs is that they are specialists having a too narrow view of their function. This complaint is variously expressed but seems to mean that the industrial-arts teacher is not interested in the total program of the school and feels no particular responsibility to contribute to the general purposes of the school program beyond the teaching of his shop and drawing courses. To the extent to which this criticism is valid it is often caused by an overemphasis on shop and technical courses in the teacher-training curriculum at the expense of general or cultural courses in the institution from which the teacher was graduated. He is of necessity a specialist, usually possessing special mechanical aptitudes and interests and a corresponding dislike for academic and professional subjects. It is a mistake, however, to encourage the "specialist's attitude" to the extent of producing a teacher who is either seriously deficient in cultural and professional education or is indifferent or antagonistic to the cultural purposes of the school. Many industrial-arts teachers who possess much native capacity and excellent mechanical and technical training are handicapped throughout their professional careers, and are often denied opportunities for professional growth and advancement, by their lack of a sufficiently broad and thorough general and professional education. This deficiency in their education and the character of their interests causes many to be unable to do satisfactory graduate work in the university and forces them to play a minor role in the activities of the school faculties where they are employed. The teacher-training curriculum should at least give sufficient foundation for future interest in and reading of the books that produce breadth of interests and outlook. The major contribution of college education should be a stimulation of, and a foundation for, continuous intellectual and professional growth throughout life. It is particularly important that the institution that trains industrial-arts teachers shall strive for this outcome of its instruction.

Summary and Conclusions. There are three general types of industrial-education teachers for which training has to be provided, namely, the trade shop teacher, the related-subjects teacher, and the industrial-arts teacher. The first two types belong specifically to the field of vocational education, while the third belongs to the field of general education; but all three have need for many common traits and for similar professional and technical preparation. The trade teacher, of necessity, must be an experienced tradesman, and the related-subjects teacher must have at least some experience as an industrial worker. The industrial-arts teacher usually enters teaching directly from a teacher-training institution, but he, also, finds trade experience to be of great value as a phase of his training, when it is possible for him to acquire it. All three types deal with much the same materials of instruction, though at different learning levels. The basic difference between the work of the two types of vocational-industrial-education teachers and that of the industrial-arts teacher is in the purposes of their work. The difference in purpose, obviously, affects the character of the courses of instruction and determines points of emphasis in teaching. Notwithstanding the different outcomes of the instruction in the two major areas of industrial education, the teachers in each need to be skillful in teaching techniques, familiar with industrial practices and production trends, and trained in the technical phases of the fields of trade and industrial work in which they give instruction. All the three types of teachers must be highly skilled in the processes they teach. Industrial-education pupils, perhaps to a greater degree than any other learners, expect their teachers to be skillful in the processes being taught. Nothing more quickly and surely destroys the pupil's respect for the teacher than the teacher's lack of skill when demonstrating a process, whether it is in related technical subjects or in shopwork. Hence, the training of the industrial teacher must include emphasis upon skill in the processes that are to be taught. His training, then, involves professional knowledge and skill, technical knowledge and skill, and skill in the tool and machine processes that belong to the particular industrial area in which he gives instruction. In addition he must have the desirable attitudes and moral standards that society expects him to develop in his pupils.

QUESTIONS AND ASSIGNMENTS

1. Aside from the differences in the character of the instructional materials used, what differences should there be in the training of teachers of academic subjects and teachers of industrial education?
2. What courses in professional education would you recommend for the training of trade shop teachers? Give reasons for your recommendation.
3. In what respects should the training of the industrial-arts teacher differ from that of the trade teacher?
4. Which of the following do you regard as the most desirable source of related-subjects teachers: (*a*) engineering colleges, (*b*) teachers colleges, (*c*) industry, (*d*) high-school science and mathematics faculties, or (*e*) high-school industrial-arts faculties? Give the reasons for your choice.
5. Plan a program of technical subjects you think would be desirable for (*a*) a trade shop teacher, (*b*) a related-subjects teacher, and (*c*) an industrial-arts teacher. Give the reasons for your selection in each case.
6. Indicate the elements in the training of industrial-arts teachers, trade shop teachers, and related-subjects teachers that should be similar or identical.

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Chapter 19

SUMMARY OF PROBLEMS AND NEEDS

Inherent Characteristics. To be effective, industrial-education services to a community should never be regarded as a school "subject," such as history or mathematics, but as a *program* of training services to the youth and adults of the community. The tendency of educational authorities to consider industrial education as merely another school subject has been one of the retarding influences in its development. If it be granted that a democratic education program must provide and ensure "equality of opportunity to grow and achieve to the extent of one's ability," a minimum offering of shop and drawing courses designed merely to serve the youth in school is utterly inadequate and undemocratic. A much more comprehensive concept of the function and character of industrial education than is usually expressed is one of the major needs of public education. It is also essential that any program of industrial education that is even approximately adequate to community needs must be flexible in organization and procedure. No other feature of the educational program is more immediately responsive to economic and industrial conditions than is industrial education. Every significant change in the employment situation, such as the shifting of production emphases, technological developments, and population growth or migration, immediately affects the service needs that must be met by the industrial-education program of the schools. It is this fact that necessitates a degree of flexibility seldom needed by any other department of the school system. A further characteristic is the great complexity of the program. Not only are numerous age and occupational groups of the population to be served, but the vocational needs of individuals within a given group vary greatly. Some workers require a brief retraining for a trade or industrial occupation they once practiced, when, for some reason, their skills need to be redeveloped, or they have to learn how to deal with new technical materials. Others need training for an occupation not yet entered; some need upgrading to improve their work or to win promotion in the occupation in which they are presently engaged; some desire intensive training in a narrow, specialized occupation, or division of a trade; others want a broad trade training. To meet the many special needs at different levels of age and work experience necessitates a complex organization of instructional services. One other inherent characteristic of vocational-industrial education is the great variation in the time required to meet the several training needs. The traditional school units of time, such as quarters, semesters, and a school year of nine or ten months, have no significant relationship to the periods of time required to meet the several special training needs of industrial workers and prospective workers. The attempt to make all phases of an industrial-education program conform to a traditional academic time schedule often constitutes a serious handicap to the program.

The industrial-arts activities of the school also are rendered less effective by a failure to recognize their inherent characteristics. To attempt to require shop classes to conform to academic class periods always affects adversely the effectiveness of the work. Shop periods that are two or three times the customary length of academic-class periods have been found to be more than twice or three times as effective as shop periods of equal length with the academic periods. This is due to the longer time required for accomplishing a given degree of progress in shopwork than in a class period involving chiefly verbal activity. Another factor involved is the amount of time needed in preparation for work in the shop class and that is necessary for cleaning equipment, the storing of unfinished materials and work clothes, and the washing of hands at the close of the period. These characteristics, together with the many types of tools, machines, and other items of equipment that must be provided, and the teaching of their proper uses make this phase of industrial education also extremely complex in organization and procedure. Both phases of the field are inherently challenging to pupil interest and when well taught, possess great educational values, whether designed for school children, out-of-school youth, or adults.

Factors Affecting Industrial Education. As indicated above, vocational-industrial education is peculiarly sensitive to employment, technological, and general economic changes and conditions. When industry is operating at near or complete capacity and there is great demand for workers, part-time classes of the several types, apprentice classes, evening classes, and foremanship classes are likely to increase considerably, while all-day trade-preparatory classes will either decrease in numbers or increase at a much slower rate. In times of general industrial unemployment part-time classes rapidly decline in size, and full-time day classes increase. When wage scales are such that machine operators and other semiskilled workers earn as much or more pay than skilled mechanics, the day trade classes rapidly diminish in numbers, since most youth find it almost impossible to see any need for learning a trade when, for the time being, they can earn as much or more at jobs that require little or no preemployment training. When new inventions or new technical practices are developed in an industry, rapid short-unit training courses in the new techniques are in demand from experienced workers. As the use of complicated equipment in industry increases, industrial training programs for those under sixteen or eighteen years of age tend rapidly to disappear because of the unwillingness of industry to employ immature youth to operate costly equipment. As social attitudes change with respect to juvenile employment, training courses designed for the several age groups are enlarged or decreased according as the resulting laws affect types of work permitted for juveniles. As increasing numbers of young persons complete four years of high school before entering wage earning, vocational-industrial education tends increasingly to become a feature of the last years of high school and of the post-high-school period of life. As technology develops in productive processes, special technical training of a post-high-school character becomes an increasingly important phase of the industrial-education program. This sensitivity to the conditions existing in economic and social life generally, and particularly in industry, necessitates constant alertness on the part of the administrators of industrial education and a readiness to change quickly to meet changed needs.

Continuous Surveys. The obvious need for flexibility of programs suggests the importance of frequent surveys of the employment situation as well as of production developments and impending developments in industry. If the school program is to serve the community effectively, needed adjustments must not lag too far behind new employment conditions. Because tax-supported institutions are always much slower to discard established procedures and obsolete equipment than is industry, the industrial-education authorities are often adversely criticized for not maintaining up-to-date facilities. This is particularly a difficulty confronting the day trade-preparatory phase of the program. It may, however, also become a defect in the total program unless the school authorities keep fully informed with reference to new developments in industry. Not only should new developments be considered, but surveys should be so conducted as to indicate, as far as possible, trends in production so that school plans can be made to anticipate changed needs. Well-chosen advisory committees can be of much help in adjusting programs to meet new conditions and in trying to anticipate future developments.

Role of the School. The school is the only institution established and maintained by society to provide the education and training held to be desirable by the prevailing social, economic, and ethical beliefs of society. Industry is conducted primarily for financial profit. Education and training are the primary functions of the school; hence, it is, or ought to be, interested in all forms of education or training whether they are conducted by the school or by other agencies. Since industrial education is of major importance to the welfare not only of millions of persons but of the nation as a whole, it should be one of the major concerns of the school. The school should recognize its responsibility to ensure an opportunity for all forms of needed industrial education whether or not the training is provided in the school. The leadership necessary to guarantee adequate opportunity for the industrial training of all youth and adults who desire it should come from the school. Only rarely has the school fully exercised this function. When the needed leadership is provided by other agencies, the general welfare and that of the individual learner are less likely to be the controlling factor in the training provided. In the case of cooperative programs conducted jointly by industry and the school it is important for the school to take the initiative in establishing the program and in ensuring its continuous and successful operation. Society, operating through its one official educational agency, the public school system, should have the final authority in all educational programs. It is also important in cooperative training projects that the school shall provide all phases of training that are not adequately or appropriately provided by industry and that it shall make certain that industry provides its part of the program without exploitation of the learners. Throughout most of its history the school has been concerned almost exclusively with those in full-time attendance and who are able to conform to conventional plans of instruction. Such a scheme of education is wholly inadequate to meet present-day needs. The modern view that the function of the school is to ensure the opportunity for all kinds of education for all kinds of persons and under many different conditions of operation gives to the school a far more important role and a much heavier responsibility than it has known in all its history. It follows from these considerations that the public school system is finally responsible for the industrial education of all who find their vocation in industry.

Retraining Programs. It was suggested above that the school is as responsible for the training of those not in school as for those in full-time attendance. Such responsibility will of necessity include the adult industrial worker. A problem of growing importance is the retraining of workers whose vocational duties are changing. Every feature of the present industrial situation points toward an ever-increasing need for extensive facilities for the retraining of such workers. The continuous and rapid expansion of industry and the remarkable technological developments resulting from the research activities of industrial laboratories make inevitable continuous change in processes, materials, and products, and the need for training in new skills and new knowledge among production workers. The devices thus far found most effective for the retraining of industrial workers are (1) the part-time class operated by public schools, private schools, and plant schools, (2) the evening school, and (3) the short, intensive training course given either on evening or full-time basis. The home-study, or correspondence, school also is useful in retraining experienced workers. The particular training scheme adopted depends upon the character of the retraining needed and the employment status of the persons to be trained. The rapidity with which successful retraining can be accomplished depends chiefly upon the intelligence of the trainee, the breadth and quality of his general education, and upon his previous industrial training and job experience. The similarity of the new skills and factual knowledge to those already possessed is also an important factor in the rapidity of retraining. All great national emergencies, such as war and economic depressions, emphasize the importance of retraining programs for industrial workers, but it is also a continuing responsibility of industrial education in any democratic industrial nation.

Groups to Be Served. The complexity of a comprehensive program of industrial education has already been stressed. If all those needing training are provided for as they should be in a democracy, the number of groups to be served is large. In the full-time school program industrial-arts courses are needed for elementary-school boys and girls, for junior- and senior-high school children and youth; and trade classes are needed for the upper years of senior high school and increasingly for the first years of post-high-school life. For the thirteenth and fourteenth years vocational-technical training is of growing importance and promises to be a major phase of programs in the years ahead. The evening school is specially adapted to the work of retraining experienced workers in vocational skills and materials closely related to present jobs, and also to the business of upgrading employed persons. Industrial arts is adapted to providing craft experiences of a recreational character for adults of the community who are engaged in occupations other than industrial work. Home-study courses serve those engaged in industrial occupations who desire to upgrade their work, to win promotion, and to learn the technical phases of a new occupation. The several types of part-time classes serve the needs of apprentices and other employed workers as well as school boys and girls who desire to acquire an occupation while studying to obtain a high-school diploma. With industrial arts and vocational-industrial education both in the program it is possible to serve most of the needs of the citizens of the community for industrial education, from the kindergarten through the fourteenth year of secondary education. By a close cooperation with industry other groups, such as supervisory and managerial employees, can also be trained for better work; and where there is need for it, upgrading training can also be provided for public servants, such as peace officers, sanitary works, and firemen. A review of the groups that are now being served by comprehensive city school programs of industrial education demonstrates both the breadth and complexity of this phase of public education and its importance in the total school program.

Preparation for Growth. Vocational-industrial education needs always to be specific in character, but it need not be so narrow in range of instruction as to retard or make unduly difficult continuous growth in vocational knowledge and ability. Those responsible for the planning of programs should never lose sight of the need for continuous growth of those served by the program. It is possible to plan a course that is so narrowly specialized that it does not promote growth. Depth and breadth of knowledge are the requisites of continuous growth in ability. Hence, it seems always desirable to construct courses that lay as broad and deep a foundation of understanding as the time available and the intelligence of the learner will permit. While engaged in teaching a simple industrial skill, there are many opportunities to teach important facts that lead to thinking and to questions about the techniques, tools, and materials involved, thus causing the learner to perform the skills intelligently rather than blindly as a mere robot. There are plenty of machines to perform the skills that do not involve the thought, interest, and judgment of the worker. When human beings are trained to perform industrial skills, they should be trained to perform them with some degree of interest in the outcome and with intelligence concerning the process. The time spent in making industrial work interesting by injecting into the teaching process rich informational material is not time wasted if the learner is expected to grow as his job experience increases.

Need for Better Teachers. During recent years the quality of the teachers engaged in industrial education has been greatly improved. For the most part the quality of both industrial-arts teachers and teachers of trades and industries is higher than ever before in the history of organized industrial education. Yet there is obvious need for much improvement. In far too many instances the general education of industrial-arts teachers has been unduly shortened in order to multiply manual skill experiences, many of which are of such character that they could easily be acquired outside the school hours of the student-teacher. The result has been many teachers unable fully to appreciate or take an active part in the educational program of the school. In such cases both they and their division of the program have suffered in prestige and in needed support from school authorities and colleagues. It is particularly important that young men of high general capacity shall be drawn into the industrial-arts teaching field and that they shall not be too narrowly educated and trained. The first requisite of vocational-industrial-education teaching is successful vocational experience in the work to be taught. That fact, however, in no wise necessitates a too narrow professional training of these teachers. Successful trade experience ensures the possession of a capacity for careful thinking, good work habits, and the ability to learn the facts and to acquire the skills of the teacher; and teacher-training programs should take full advantage of this fact. The trade teacher must have and can acquire as broad and deep professional training as time and circumstances will permit. It is a mistake to confine his training to the mastery of very simple, routine teaching procedures. He needs to have questions stimulated in his thinking about the justification of proposed teaching techniques and course-making procedures as well as the social consequences of this work. Where selected tradesmen in training for industrial-education teaching are placed in college classes in professional courses with other student-teachers, it is seldom that they are unable to do as successful work as the other students, even when they are unable to meet any of the conventional prerequisites of the course. They can and should be broadly trained for their work.

Need for Research. There is great need for more and better research in industrial education. There is a growing accumulation of research reports, but there are few of any great significance. The founders of the vocational-education movement of the early 1900's based their propaganda and proposals on factual data and thus established a sound precedent for the development of this field of education to follow. Many carefully conducted surveys have been made to determine requisites for industrial-education programs, and numerous statistical studies of existing practices have been reported; but little has been done to determine experimentally the most effective procedures in teaching and in administrative and supervisory practices. The deficiency has doubtlessly been due to the urgency of expanding existing programs and to the relatively few persons engaged in the field who have possessed adequate training in research procedures. This situation is slowly being improved in vocational-industrial education. In industrial arts the situation is more rapidly changing. In both cases the improvement is due to the increasing number of selected young men who are entering the field after obtaining advanced graduate degrees from first-class universities. The need is still great, however, for more fundamental research in industrial education and for cooperative undertakings with research scholars in the fields of economics, engineering, psychology, and sociology. There is also a need for developing a greater interest in the use of research findings on the part of industrial-education administrators and teachers in both industral arts and vocational-industrial education. This is primarily a responsibility of the teacher-training institutions, and great immediate improvement cannot reasonably be expected. On the whole, however, the outlook for more and better research in industrial education is most encouraging, and there is evidence of an increasing interest in research results among teachers and administrative leaders.

Need for Large Area of Support. It has been convincingly demonstrated that few school districts are able to provide an adequate program of industrial education. Even with state and Federal aid only the most thickly populated industrial centers have proved able to maintain all the needed training services. The only feasible means of meeting needs fully in other places are: large special vocational schools supported and controlled by the state, or by geographic areas much larger than the conventional school district. The area vocational school appears to be the most practicable solution of the problem of offering the flexible and varied type of program that is indicated by present-day industrial-education needs. There is no inherent feature of such a school that interferes with full cooperation with established secondary schools. An area vocational school neither competes with the high schools of the area served nor duplicates their services. It is designed to serve only those youth who have left the high school either as dropouts or graduates and the employed and unemployed youth and adults of the area. By defining the vocational-school areas of support on the basis of population density, taxable values, and transportation facilities it is possible to provide adequate training service to all types and ages of industrial workers. Outside the largest cities the public schools, as at present organized, supported, and administered, cannot render the needed service, and there is no reason to suppose that they will be able to do so in the foreseeable future. The junior, or community, college operated by the local school district is no more competent to provide an adequate program of industrial education than are the high schools. It seems clear that, if the full responsibility of public education for providing adequate facilities for industrial education is to be met, the only alternative to an area vocational school supported and controlled by an area smaller than a state is one supported and controlled by the state. In any case it will doubtless be necessary for many years to come to provide Federal aid to all types of vocational schools if even an approximation of equality of opportunity for needed vocational education is to be offered American youth and adults. The principle of the support of vocational schools by areas as large as a state has never been questioned when they are of college grade. State teachers colleges, medical schools, law schools, and agricultural and mechanical colleges are all types of area vocational schools. The principle is well established and has long been accepted by the citizens.

Discernible Trends. As indicated earlier, industrial education is quickly responsive to economic and employment changes. Trends, therefore, cannot be determined by observing developments over periods of a few years, but only by considering the general direction of developments over a long term of years. With reference to the different types of vocational-industrial-education classes it appears that the part-time trade extension and evening classes are becoming increasingly important. The general continuation classes for the group under sixteen years of age appear to be rapidly losing the relative importance they enjoyed before the beginning of the economic depression of 1929. The all-day classes seem to be slowly losing ground in relative numbers. The number of trainees in all types of classes has shown a consistent increase since the establishment of Federal aid for vocational education in 1917, except for a sharp dip in the curve of growth during the depression of the 1930's. In so far as enrollment numbers are concerned, the over-all trend is toward a steady growth for vocational-industrial education considered as a whole. The growth in the industrial-arts phase of industrial education has been continuous for many years and has been unusually rapid during recent years. Trends other than enrollments are toward (1) a steady improvement in the facilities for the training of industrial-arts teachers and an increasing interest in advanced graduate study; (2) the rapid improvement in the quality and availability of shop equipment specially designed for industrial-arts shops; (3) better planned shop buildings and the growing interest of both architects and school administrators in the problem of shop design and arrangement; and (4) great interest in the development of general shops of several types, together with an increase in the number of different industrial materials included in the general shop courses. There has also been a growing interest in the art aspects of industrial-arts work. In some sections of the country there is a growing emphasis on the development of closer relationships between the industrial-arts courses and the other courses of the school. In the senior high school there is a clear trend toward a closer relationship between the industrial-arts program and that of vocational-industrial education. Perhaps the most noticeable trends in vocational-industrial education, aside from trends in enrollments already mentioned, are (1) the increasing interest in postemployment-training programs and in programs involving cooperation with industry and labor; (2) increasing financial support both from Federal funds and from local and state funds; (3) greater emphasis on training in the technical phases of industrial work and on training for better management of human relations in industry; and (4) improved facilities for teacher selection and training with a corresponding improvement in the quality of the teachers who are coming into the program from year to year. There are no doubt other important trends, but these seem to be clearly discernible when the nation as a whole is considered. Local trends vary greatly, and growth of desirable tendencies is very rapid in some communities while very slow in others. The general situation, however, seems clearly to be perfectly sound, and the future to be rich in possibilities of improvement and growth in all the major phases of industrial education.

General Conclusions. Industrial education, which is probably the oldest form of education known to man, has played a major role in the history of civilization, and it plays a significant role in the ongoing of modern civilized life. Civilization would be impossible without an effective means of teaching to each new generation the skills and accumulated knowledge necessary for the making, maintaining, and efficient use of the mechanical equipment necessary for man's work in war and peace, for the building of shelter, and for the manufacture of clothing and the almost innumerable objects used in both work and play. Industrial education, whether formal or informal in character, is man's means of maintaining life and ensuring progress in all phases of life. It performs, therefore, a function of the greatest significance. It is of necessity extremely complex in its operations. From the earliest forms of unconscious imitation through informal, and later, formal apprenticeship, to modern local, state, and national programs of industrial education, man has moved from the most primitive types of society to modern industrial civilization. There has been throughout the ages a necessary and intimate relationship between the progress of man toward higher levels of civilized living and his progress in industry and industrial education. The conditions of advancement today are not different from those of past ages, and it seems clear that the future progress of civilization will be as dependent upon the development of better industrial education as it has been throughout the history of the race to the present.

QUESTIONS AND ASSIGNMENTS

1. Indicate how you would defend the proposition that a comprehensive program of industrial education is essential to a genuinely democratic educational system.
2. What are the features of the present organization of the public schools that constitute hindrances to the effectiveness of the industrial-education programs of the schools?
3. What aspects of present economic conditions are likely to affect the programs of public-school industrial education during the years immediately ahead? Indicate in detail the specific effects you anticipate and the reasons for your predictions.
4. Prepare a short paper setting forth the need for, and special advantages to be derived from, the development of area vocational schools.
5. How would you defend the proposition that the public schools are as responsible for ensuring opportunity for the education, both general and vocational, of the youth who are not in school as for those who are in school?
6. Why is it true that effective industrial education is an essential factor in the continuation of the progress of civilization?

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